

MACMILLAN'S
TEACHING IN PRACTICE
FOR SENIORS

VOLUME THREE

MACMILLAN'S TEACHING IN PRACTICE FOR SENIORS

AN ENCYCLOPAEDIA OF MODERN METHODS
OF TEACHING IN THE SENIOR SCHOOL
WRITTEN BY RECOGNISED AUTHORITIES
IN EDUCATION AND

EDITED BY
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Teaching in Practice for Infant Schools, etc.

*In Eight Volumes, with a Portfolio
of 150 Class Pictures*

VOLUME THREE



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THE TEACHING OF BOOK CRAFTS IN THE SENIOR SCHOOL

This article covers the whole course of Book Crafts for boys or girls in the senior school. It also contains suggestions and illustrations concerning the first, second and third stage exercises preceding bookbinding proper.

At the end of the article is included the syllabus of work of the E.H.A. Examinations Board General Elementary Book Crafts, and also a glossary of terms.

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**THE TEACHING OF BOOK CRAFTS
IN THE SENIOR SCHOOL**

LINO CUTS



INTRODUCTION

IT is safe to say that in the last fifteen years no school subject, with the exception of physical training, has received so much encouragement, attention and support in the schools as have arts and crafts. Teachers, inspectors, and education authorities suddenly realised that there were genuine crafts other than woodwork. For metalwork, book crafts and weaving there arose an interest which has persisted, and which promises well for the future of these fine instruments of culture.

No sensible teacher would wish to do anything which would make a child appear deficient either in his own eyes or in the estimation of his companions, and every teacher knows that there are children who will never succeed while forced to concentrate on academic subjects. A child who is incapable of learning arithmetic should be allowed to learn something else as soon as he reaches his zenith in mathematics. Such a child will often make good when trained in handicrafts. His knowledge of eights, tenths and twelfths comes easily when he realises their power and their practical uses; the right angle is no longer a puzzle; when he describes his activities, his oral English is eager and enthusiastic, instead of a laboured parade of well-worn phrases; he learns history by studying the lives of great craftsmen of the past. It is not an exaggeration to say that for him life has changed.

No one can succeed without confidence. In craftwork this confidence is engendered in those children who may have lost it, or who have never had it developed by other subjects.

He who has had a training in arts and crafts is a more observant and appreciative person than he whose life is spent with books. Man was made to be a doer. All progress has been brought about by those who acted, and, although thought must precede action, it is the action which results

in valuable discoveries. A boy learning mathematics repeats in a mechanical fashion something that he has been shown many times. He has been quick to learn the method of solving his particular type of problem and he is reputed to be a good mathematician. While the importance of mathematics must not be decried, it is true to say that a lasting pleasure has been found in the pursuit of woodwork, metalwork and book crafts which could never be found in the solving of an abstruse mathematical problem. Mathematics may help us to pass examinations and to earn a living wage. The boy who is "top in maths." is praised, but the credit is due to his innate gifts, and not because he has spent a great deal of time on his subject, as has the expert craftsman.

It is the craftsman himself who has from small beginnings built up his mastery over muscle and matter. The world enjoys watching a craftsman work—whether the work be that of shoeing a donkey, gilding a steeple's weathercock or binding a book. Passers-by will stand and stare in admiration at a craftsman. The thoughts of onlookers when a mathematician works have never been written down. The craftsman is at least as good as the mathematician—that hitherto much-lauded person—he has, also, done more to help himself, and people like seeing the results of his labours of mind and body. Smith, who could never understand decimals, is a proud boy when he finds that he is the best at benchwork. It is not argued that he is the best at craftwork because he is the lowest in the mathematics column of the Term List. It is more true to say that a boy interested in craftwork will be abler for his knowledge in mathematics, but it is a delight to have found something for Smith from which he can derive untold benefit and wherein he can find once more his self-respect.

Those who doubt the value of craft teaching are those who have never had, or who have neglected, the opportunity of mastering any one real craft.

Children soon sense worthlessness and do not fear to show that they are aware of their discovery. Disorder and indiscipline follow when children are given an incompetent teacher or an unsuitable subject. With the right teacher to guide and direct, there is no disorder in the craft class. Noise there may be in plenty, but it is not the noise of disorder: it is the noise of busy tongues asking or answering questions; the noise of busy hands wielding tools to some purpose; the shuffling of feet finding a grip on a block or maple floor to counter a thrust of the trunk. Looking unobserved into such a room, even he who has been brought up in the academic atmosphere, is forced to admit that here is evident delight and satisfaction.

Nowhere else in the school is the teacher such a god in the eyes of his pupils as in the craft room. However difficult the task, the teacher can do it, and do it with obvious facility. Every boy will have seen his teacher making a type of joint which is a perfect fit; he himself tries, fails, tries again and succeeds. When the teacher cuts the edges of a book, working the plough requires no effort. All around must feel the lovely edge and contrast it with the one just removed. It occurs to the boy that the teacher must have been working for a long time; that he has acquired his skill through practice, and that the results of such attention are worth while. He will long to be able to make something which is good enough to take home. That he is progressing must be shown to him as soon as possible.

The enthusiasm to which birth has been given in the craft room can be kept alive through other lessons with other teachers. Having found Smith's aptitude for craft, the wise teacher of history, geography, English or science will find an opportunity of referring to Smith for some information,

thus regarding him as something of an expert. He is ready to overlook the teacher's display of ignorance and show him how, or why, or where, or when. He will ask questions; he will read; he will observe; for, having given people the impression that he knows a good deal about the subject, he will see that he never fails when called upon to supply information. He must be encouraged, and the teacher must, if necessary, be more "ignorant" if, in so doing, Smith is given the opportunity to strive and to stretch himself.

It is not enough that the craftmaster or craftmistress—men have no monopoly in craft work—should be the only person who is interested in and is expert at craft-work. The heads of all schools should be able to appreciate the efforts of teachers and pupils. It is not enough to say that a thing is "nice-looking" or "beautifully finished"—it would be more to the point to say, "I like the feel of that book." "Beautifully backed—you know how to use your hammer." "I like these tenon ends showing and they are nicely chamfered." Only he who has done all the processes time and again can appreciate.

Although woodwork has been chosen, the same principles are to be kept in mind in book crafts and in all crafts. The head, who is a passable master of woodwork, bookbinding, weaving and metalwork—or, at least, some of them—can be of great assistance to the teachers of these subjects. He sees the children's work in more than one branch and can make use of his knowledge to advance further in other branches. Smith is good at woodwork. He must be shown that it is expected of him to be good at bookbinding also, or whatever other craft has been chosen. He who is expert at one craft is soon master of another.

It is generally admitted that bookbinding proper should begin in the senior school. There must, however, be a preliminary training and this should begin in the infants'

department and be continued through the junior school. Each stage is of importance to the child, and the exercises must be planned to suit his development. In the infant school colour plays an important part, but this is often neglected in the junior school. This is a pity as the work thereby becomes drab and uninteresting for child and teacher. It would appear that emphasis should be laid upon the linking of art and craft at every stage. In the junior stage accuracy must be insisted on; the child must be shown "how" a number of times; his efforts must be applauded and his enthusiasm directed; he must be taught how to use terms such as angle, right angle, horizontal, vertical, rectangle, square, triangle, circle, diagonal, etc. No definitions will be expected; he must simply be able to recognise these shapes and distinguish one from the other. He learns to make his hands do what his brain directs, and he must, therefore, know what he intends to make and how to carry out the operations required to bring about the desired end. He sees, handles, examines or, as a result of a verbal or written description, visualises the exercise. The required operations are learned from observation or direction, and the teacher must carefully demonstrate the technique of tools and materials, remembering that children are naturally imitative and soon acquire good or bad technique from the teacher. Work must be graduated and should never become fixed. Last year's exercises will not do for this year. Examining the previous exercise critically, the enthusiast will soon find alterations which result in a better exercise and the children will quickly perceive the improvement and will suggest other methods which teach more, call for more skill, variety and exercise of taste and colour. Along these lines lies progress.

In addition to book crafts it is possible, for the boys especially, that time could be found for toymaking. It is a useful training for woodwork, and, although the tools employed are few, there is need for accurate

sawing, filing, painting, etc. There is plenty of variety in the exercises; children delight in the work, and the equipment is cheap. Children so handled in the junior school will be ready for bookbinding proper in the senior school.

Students at a training college may obtain a fair knowledge of book crafts without any experience of the practical side, and while this knowledge may be sufficient to enable the student to pass his examination in handicraft, it is certainly not enough to qualify him as a teacher of book crafts. The handwork examination consists almost entirely of woodwork, and while it is possible to study both woodwork and bookbinding, or some other craft, the average student does not attempt another subject in which he will not be examined for fear of jeopardising his chances of passing. When the university changes its syllabus and demands more craftwork and less woodwork, setting the examination with this in mind, the knowledge of crafts and craft teaching will improve tremendously. This change will mean that not only crafts, but crafts and art will be studied.

In women's colleges, bookbinding, weaving and other crafts are studied. Although in some there is not a high standard of achievement, the correlation between art and the crafts studied approaches more nearly the ideal of craft teaching than in the men's colleges.

The teacher must be an enthusiast and an able exponent of the craft. Such a teacher with a class radiates his enthusiasm, consequently fine and valuable results follow. But the enthusiast must not become a fanatic. There is a limit to the amount of time we can afford to give to craftwork in school. If the boys do woodwork and bookbinding and the girls needlework and bookbinding or weaving, little more can be reasonably expected.

It is wise to let the children make their first book in plain cartridge paper so that any errors in cutting the edges may be corrected by recutting; the sewing is done

on tapes; endpapers may be made by one of the following methods:—

1. Simple Colour Wash.
2. Stippled Coloured Paste.
3. Combed Coloured Paste.
4. Coloured Paste "Thumped."
5. Colour Blending.
6. Oil Bath Method.
7. Stick Printing.
8. Edge Stencilling.
9. Interior Stencilling.
10. Potato Cuts.
11. Lino Blocks.
12. Free Brush Work.
13. Pictorial Work in Water Colours.
14. Pen and Ink Sketches.
15. Pastel Work.
16. Character Sketches in any Medium.

Specimens of all these should be mounted, framed behind glass and hung in the craft-room. (See Class Pictures Nos. 118-126 in the Portfolio.) There should also be specimen book fronts showing various combinations of the coloured cloths available. The finished book is visualised in its cloth case. Endpapers from the sixteen varieties mentioned above, must be chosen to tone with the outside. Care must be taken here, and taste and judgment exercised. It is well to encourage this from the beginning, as it will then come naturally to the children later on.

Our conception of the teaching of art is much freer than before. At one time we copied on the right-hand page of a book the elaborate floral design which appeared on the left; we drew and shaded or painted groups of models, usually with but little success. Such work was too rigid and seldom resulted in love of the beauty of nature. We were not taught to appreciate the colour in a landscape or seascape; we were told nothing of line or the groupings of tones; we learned nothing of the composition of a picture; we were never given opportunities of visiting picture galleries, nor shown good copies of great works of the past or present. To-day, the art teacher neglects none of these and, in addition, communi-

cates to his charges some of his own enthusiasm for the nobler things of life.

It is seriously suggested that the time allotted to art in the time-table must be spent in linking up the work with the work of the craft lesson. Where craft—all craft no doubt, but more especially bookbinding with which we are most concerned here—is to be a success, it must be supported by the art lesson. An art lesson wherein craftwork is forgotten is soulless and artless. Difficulties appear where two or three people are responsible for the up-bringing of two members of the same family. Estrangements and misunderstandings follow as a matter of course. Foster parentage will not do. The two—art and craft—are twins and must be reared together and if possible by the same guardian. They must not live in separate houses; whenever one appears, the other must be in sight; the glory of each is reflected in the other. In a modern school it is difficult to conceive a successful craft teacher unacquainted with the demands of art; nor, conversely, a valued art teacher without a knowledge of crafts.

No man must sit down until the job to which he has set his hand is well and truly accomplished; nor must the teacher cease to labour until each of his pupils has learned to love and practise the truth in the craftsman's great commandment:—

"Whatsoever thy hand findeth to do, do with all thy might."

SUGGESTIONS CONCERNING THE FIRST, SECOND AND THIRD STAGE EXERCISES PRECEDING BOOKBINDING PROPER

Introduction.—The wise teacher recognises the fact that, although his school may be classed as "senior," not all his pupils have "grown up." With twenty per cent of the children it would be disappointing to attempt bookbinding proper, and to meet the needs of these slower children a number of exercises are included here which will be found to be within the capacity of

all. These exercises may, at all points, be linked up with art. Plain washes, slick printing, lino blocks, oil bath, lettering, etc., may be done again with little loss, though the suggestion for each fresh attempt should come from the pupil and not from the teacher. The exercises also teach accuracy and neatness, and form a very useful introduction to bookbinding proper.

It should be emphasised that a discussion should precede each lesson and that the teacher should first show his own finished exercise and then proceed to demonstrate the steps and possible pitfalls. We must ask ourselves how skill is acquired; how we arrived at our own standards. We achieved success first by observation, experiment, failure; then by further observation, new attempts with slow but increasing success, the development of critical faculties and a realisation of the fact that we may still go on improving.

It is to be hoped that no teacher would be so foolish as to go into a class with a specimen which he has not made himself, or with only a book drawing from which the children are expected to work. Along that way lies disaster. The teacher guilty of such an action may not have his heart in his work and should transfer to another subject. Before book crafts can be taught to the best advantage, the teacher must be convinced of the great worth and potentialities of the subject.

As in any other craft subject, classes should not exceed twenty in number. Elsewhere in this course this thought is developed and an appeal made, after thirty years of experience, that "half classes" should be the rule.

The distribution and storage of materials, apparatus and exercises must be carefully planned. Each child should have a cardboard box, 10 in. by 7 in. by 2 in., for example, which would hold the bits of his exercise. Each box should have a label whereon would be printed the class letter and the child's number on the class register. These boxes, brought by the monitors into

the room before the lesson, are placed in four piles in a recognised order on the front desks. Each child can go at once to his box and be working within a minute. No names appear on the label and a rearranging of the register simply means changing over box lids. Other methods will occur to the thinking teacher.

In the early exercises, ordinary thick paste will be found more useful than glue.

Much is made of the need for children to cut accurately, but its importance can be over-estimated. Accuracy in measuring is of greater importance. I would suggest that the children be allowed to use a card-cutter. Adults use them in order to obtain a clean, straight edge, so why not the child? Some people say that the machine is dangerous. A table knife or fork may be dangerous—I have never seen a child cut his fingers though I have seen teachers do so!

Where coloured paper is required, the children should sometimes be allowed to do their own colouring. "Pastel" papers are scarcely suitable, because the colours are so drab. $\frac{3}{4}$ lb. and 1 lb. strawboard will meet all requirements.

Every effort should be made to have the same teacher responsible for craft and art—the two cannot be separated. Craft without art is lifeless although, to a degree, beautiful. Art grew out of craft, and must not be separated from it. The craft lesson will be an art lesson for some children, and in the same way the art lesson will be, in part, a craft lesson. The best arrangement is that two seventy-minute periods are given each week to "craft and art."

At this point I suggest that reference be made to Section II of the bookbinding proper for suggestions as to how to link up art with craft.

Directions, much more detailed, are possible, but they are only personal ideas and by being slavishly followed will kill all initiative. It is better to realise that all difficulties can be surmounted by thinking people and in several different ways, all of

which will be welcome if original. In the same way, every little suggestion from a child should be welcomed, and the habit of making suggestions encouraged. When starting from the beginning, everyone must strive to build up a tradition, or graft a new one on to an old.

The exercises as given are only skeletons. It is up to the teacher, aided by the children, to put flesh on the bones, clothe the body and breathe into all a spirit.

FIRST STAGE HANDWORK EXERCISES LEADING TO BOOK- BINDING

Aims.—

1. To learn to use the ruler and pencil; to measure 1 in., $\frac{1}{2}$ in. and $\frac{1}{4}$ in.
2. To learn to use the knife and safety ruler.
3. To learn to fold, paste and fix cloth for hinges; to paste and fix papers.
4. To learn how to cut and fix mitres.
5. To learn about horizontal, vertical, oblique, right angle, rectangle, square.
6. To teach discretion and taste in the use of colour.
7. To teach the elements of design by line, stick printing, potato, etc.

Implements used.—Pencils, rulers (measuring and safety), set squares, try-squares, knife.

Series of models illustrated on Plate I.—

1. *Rectangles.*—A piece of paper $7\frac{1}{2}$ in. by 6 in. is cut for the background. Strips, five or six in number, 1 in. wide and 4 in. long, are cut and pasted on the background to form a rectangular patch. Test the patch by measuring—opposite sides equal; diagonals equal. The borders may be varied with an "A" class; for others they must be equal. Lines must be drawn through accurately placed dots. See aims 6 and 7 above.

2. *Rectangles.*—Weaving of 1 in. strips, two colours, through 8 in. by 6 in. background, to form a 6 in. by 4 in. patch. Borders again may be varied at the discretion

of the teacher. The strips, greater in length than the length of the patch—or width, if so woven—are kept in position by a spot of paste attaching them to the back of the background. The background may have a paper panel, $\frac{1}{4}$ in. border. The background is first accurately ruled and then slit as far as the boundaries of the patch. Note aims 6 and 7 above.

3. *Squares.*—A paper background of 6 in. square is cut. A paper $3\frac{1}{2}$ in. by 4 in. is cut and ruled as a calendar card and filled in using Indian ink. The calendar card is pasted in position. Aims 6 and 7 are to be observed.

4. *Weaving.*— $\frac{1}{2}$ in. strips are woven to form a borderless mat—by no means an easy exercise. To begin with, a horizontal strip and a vertical strip might be attached to form a right angle and also form the top and left-hand pieces. These had best be left to set. Use a quick-drying adhesive such as glue or Seccotine. A child is made to realise that fingers must be nimble and gentle.

5. *Squares.*— $10\frac{1}{2}$ in. strips in two colours are woven to make a rectangular patch of 5 in. square in the centre of a 7 in. square background. The back is panelled. More accurate measuring and slitting than in No. 2 above are necessary. Note aims in 6 and 7 above.

6. *Squares.*—A $5\frac{1}{2}$ in. square of pasted paper has placed on it a 4 in. square card. The corners of the paper are mitred. The edges of the paper are turned round the card edge and rubbed down. A paper panel is pasted on the back, leaving a $\frac{1}{4}$ in. border. Aims 6 and 7 are to be observed.

7. *Rectangles.*—This exercise is as in No. 6, except that a rectangle instead of a square is used. A draughtboard, in one piece, might be attempted as an extra. Note aims 6 and 7.

8. *A case.*—Two pieces of card $5\frac{1}{2}$ in. by 4 in. are joined by a cloth strip of $6\frac{1}{2}$ in. by $2\frac{1}{2}$ in., keeping the boards $\frac{1}{4}$ in. to $\frac{3}{8}$ in. apart. The remaining areas of the outside of the boards are covered with decorated

paper, which is pasted, mitred, turned over, and rubbed down. The inside of this case is panelled right across with a decorated paper. One board has two or three holes punched through the cloth-covered edge and about $\frac{1}{2}$ in. in. Through these holes a similarly perforated pad of paper may be laced on, using raffia, silk ribbon, etc.

9. *A letter rack*.—Required: one piece of card (strawboard of 1 lb. weight quality) 8 in. by 4 in.; one piece 4 in. by 4 in. Each piece is treated as in Exercise 7 above. The two cards are attached at one end by raffia, etc., laced through two or three holes. The other end of the longer board has two eyelets let in for hanging purposes. When so hung, the shorter board falls outwards at its free end and makes a letter rack. Corners may be left square, cut away, or rounded.

10. *A letter rack*.—Two cards similar in size, if desired, to those used in Exercise 9 above, are joined by a cloth strip, using fairly thick paste, as in making the case in Exercise 8 above. This makes a more substantial letter rack than in Exercise 9.

11. *Pen and pencil holder*.—Two cards or boards, $7\frac{1}{2}$ in. by $2\frac{1}{2}$ in. are joined as in Exercise 8 above. Pens, pencils, scissors, short ruler, etc., are attached to a $7\frac{1}{2}$ in. by $2\frac{1}{2}$ in. card, as seen in shops, by narrow flat elastic, and the card is affixed to the inside of one board.

12. *Bookbinding*.—A case is made as in Exercise 8 above. Into this and through the cloth hinge, a single section book is sewn, using a pamphlet stitch, worked as follows. The path of the needle in a pamphlet stitch is—(1) out through the middle from the inside; (2) in from one end; (3) along the inside to the other end; (4) out at this same end; (5) in through the middle at the hole made by the needle first coming through. Looking at the inside of the book or pamphlet we see a long thread extending from top to bottom—or from “head” to “tail,” to use the technical terms. The beginning of the thread is on

one side of this and the finishing end should be on the other. The ends are now knotted and the long thread tightly held down into the middle hole.

SECOND STAGE HANDWORK EXERCISES LEADING TO BOOKBINDING

Naturally the new work in this scheme will be more difficult than that given to children in the first stage—the thicker strawboard (1 lb.) used increases the difficulty, and the exercises are more involved.

Introduction of the corner.—A template is sometimes used, but, being mechanical, is not recommended. More training is given by the following method, the steps of which are shown in Plate III.

Series of exercises illustrated in Plate II.—

1. *A single-section book and case*.—The book will consist of about four equal-sized sheets, say 6 in. by 4 in., folded in two. The outside sheet is to be made by any of the methods described in *Book Crafts II*; the sewing will be done through a strip of cloth at the back of the fancy endpaper, using a pamphlet stitch. The case—the two “boards” (the technical term for the strawboard pieces or cards used) will extend about $\frac{1}{8}$ in. beyond the book edge. The two boards are joined by a cloth strip extending on to the boards for a distance decided by personal taste—probably about one quarter of their width. The strip will be $\frac{3}{4}$ in. longer than the boards to allow for a $\frac{1}{8}$ in. turn-in at the “head” and “tail”—and with a space between the boards, to allow for the thickness of the book. The remainders of the boards on the outside are covered with decorated papers made in the art lesson. These will be large enough to allow for mitring and turning in round the book edge. Both sides of the cloth strip through which the sewing was done and the backs of the fancy paper are pasted; the book placed in position on one

board; the other board dropped into place; inspected; and the whole given a nip in a letter press or placed under a light weight to set for a short time.

2. *A case for drawings.*—Two boards, A and B, each $7\frac{1}{2}$ in. by 6 in. are first made. A has $\frac{3}{4}$ in. cut off its length. Let us call the two pieces C and D. Then $A = C + D$. B will form one board of the case. $C + D$ will be the other. A strip of cloth 7 in. by 4 in. will join A ($C + D$);—but C and D will be separated from each other about $\frac{1}{4}$ in.,—and B, leaving a 1 in. space between B and ($C + D$). The outside of the board will be covered with one rectangular piece as in Exercise 1 of this set. The inside of the case will have a strengthening strip, the width being the same as the outside strip, but the length being just short of the width of the boards. This will be pasted, rubbed into position on one board against the edge of the same board, along the "valley" (space between the boards) and on to the second board. The boards are lined with "made" paper. Through C and B (No. 2a) three holes are punched—one in the middle and one at each end. Coloured ribbon or raffia is laced through these and through the similarly punched papers within. The $\frac{1}{4}$ in. cloth hinge between C and D allows D to open right back for inspection of the contents of the case.

3. *A blotting pad.*—Here, corners are introduced. The stages in their construction are shown in the illustrations, Plate III.

(a) Two cloth squares, about 3 in. square, are prepared.

(b) Each square is cut along its diagonal, using a knife and safety ruler.

(c) The four triangles obtained in (b) are superimposed and about one-third of their perpendicular height, a , cut off.

(d) The four pieces as shown in (d) are the final results.

(e) About $\frac{1}{8}$ in. of long side AB of each corner is "tipped" lightly with paste and turned back to avoid having a raw edge, which would soon fray and look unsightly. These are put aside to dry.

A base board 8 in. by 5 in. (No. 3, Plate II) will be covered with a "made" paper.—as a reminder, turn to Lesson 2 in the *Book Crafts* section. A second board, $7\frac{1}{4}$ in. by $4\frac{3}{4}$ in. is required. This will be covered with another "made" paper and have the corners added and the whole finally attached to the baseboard. Care is needed in putting on the corners. They must be attached only to the back of their card; the front, right up to the edges, must be free for the insertion of the blotting paper. This desired result is brought about by turning the card with the back up, slipping the corner under as shown in the sketch (c, Plate III)—putting a loose piece of card between the card and the cloth corner to allow for the thickness of the sheets of blotting paper—and keeping the cloth corner away from the angle of the board to a distance of not less than the thickness of the board and the extra piece just inserted. With the left hand on top to prevent movement, the two equal areas of the cloth corner showing beyond the edges of the board are lightly pasted; one edge is turned up and over, the projecting part at the angle is turned over towards the free area, and the second area folded up and over. Each corner is similarly treated. The back is pasted or glued, and still keeping the loose pieces of card in the corners and other pieces of card where required to get pressure all over, the whole is placed on the base so as to leave $\frac{1}{8}$ in. showing all round and nipped in a letter press or placed under weights and left to set.

4. *A wallet.*—Required: three cards, A 6 in. by 3 in.; B = 6 in. by 4 in.; C = 6 in. by 2 in.; and cloth $11\frac{1}{2}$ in. by $7\frac{1}{2}$ in.

The cloth is pasted or glued. Starting from one end of the cloth, the boards are put down in the order A, B, C, each about $\frac{1}{8}$ in. from the next. Each joint will have an inside strip. Each board will have a panel of "made" paper pasted on it. A will be folded over B, and C over both. Between A and B a gusset is inserted at each end. The right way of attaching a gusset allows

of the full length of the pocket being used and the gusset folds inwards; in the wrong way only part of the length of the boards can be used and the gusset folds outwards. Refer to the illustration No. 4a to understand this clearly.

Thus, holding the pocket so that the gusset ends are vertically over each other, and the pocket partly closed, the top gusset will appear as a capital M (top = M); the bottom will be a capital W. The gusset is then on correctly: if the order is reversed, then the gusset has been wrongly attached. A press stud and elastic band or other arrangement, keeps the wallet closed.

5. *A wallet*.—Required: three boards, A = $4\frac{1}{2}$ in. by $2\frac{1}{2}$ in.; B = $4\frac{1}{2}$ in. by $3\frac{1}{2}$ in.; C = $4\frac{1}{2}$ in. by $3\frac{1}{2}$ in.; one piece of cloth of $11\frac{1}{2}$ in. by $5\frac{1}{2}$ in. Piece A has two corners removed as shown in the sketch. The cloth is shaped for A, pasted, and the three boards placed in position; corners mitred; cloth turned over; joints lined as in previous exercises; boards lined with "made" paper. A separate pocket—the teacher will decide on the form—is made and attached to C. C is turned over on B and A on top of both. Some form of fastening must be decided on. At this stage perhaps a rubber band would do. A press stud is easily added. The whole outside is to have some form of decoration done on it; e.g., lines in Indian ink; the cloth might have been dipped in the oil bath (Lesson 2, *Book Crafts*); free brush work, etc. etc.

6. *Album for cuttings or photographs* (No. 2b Plate II).—Required: two boards, each 7 in. by 5 in.; twelve sheets of cartridge paper, each sheet 7 in. by 5 in., plain or coloured; plain for photographs in monochrome, coloured perhaps for coloured pictures. Each pair of sheets is joined by a cloth strip the same length as the boards and 1 in. wide. These pairs are similarly joined to form fours—three in number. The three fours are joined by other cloth strips, to make the book. The two boards are joined by a cloth strip, leaving between them a distance equal to the thickness of the

album. Each outer board is pasted and let down on an end sheet and given a nip in the letter press or placed under pressure. The outside is decorated and lettered.

7. *Half bound portfolio* (not illustrated).—Where two boards are covered all over with one and the same piece of cloth or leather, the book is said to be *whole bound*. Where the boards are joined by a cloth or leather strip and have corners of the same material, the book is said to be *half bound*—roughly half the area of the case is cloth or leather covered. The remainder of the boards is done in paper or another cloth or leather. Where the boards are joined by a cloth or leather strip and have the remainder covered with a rectangle or other material quite separate from the strip at the back, the binding is known as a *quarter binding*.

The sides of the boards will be decided by the size of the intended contents. Imperial paper is 30 in. by 22 in. Imperial octavo (8vo) is $\frac{1}{4}$ of 30 and $\frac{1}{2}$ of 22 = 11 in. by $7\frac{1}{2}$ in.—the length is usually given first. Allowing for a space all round and using imp. 8vo. paper within, the boards will be $11\frac{1}{4}$ in. by 8 in. The making and fitting on of corners had better be done before the boards are joined. The corners on, the boards are joined with a cloth strip and the joint lined. (See Lesson 6 in *Book Crafts* for fuller details.)

Decorating a half binding is not so easy because of the odd shape of the inlay of the boards. Line decoration and a centre panel piece are possible. About 1 in. from the centre of the fore-edge a hole is made with a chisel, $\frac{3}{8}$ in. or $\frac{1}{2}$ in., and a tape is inserted, drawn through about 1 in. and pasted or glued down on the board and "riveted." The opening is beaten flat with a hammer. The insides of the boards are lined with a "made" paper.

8. *A folding draught board* (not illustrated).—If the squares are to be 1 in. side, the boards will be each $8\frac{1}{2}$ in. by $4\frac{1}{2}$ in. The boards will be joined by quarter binding. The lining of the boards in this

case will consist of the squares—in two colours of course. Apply colour wheel knowledge, giving contrasting colours. There will be scarcely any need to fit a fastener to the case.

9. *Half binding* (not illustrated).—This is another exercise similar to No. 7 and is made to hold half an exercise book, which will be sewn as a single section book described in Exercise 1 of this set. The decoration is to be in a different medium from those already used.

10. *Half binding* (not illustrated).—This is half binding in a larger size; decoration again is to be more ambitious—edge stencilling, potato cuts, lino blocks, free brush work, etc.

11. *A quarter bound portfolio* (not illustrated).—To hold Imp. 8vo. drawing sheets or duplicated words of songs or poems, etc.

12. *A half binding* (No. 12, Plate II.).—This is for a blotter inside one board and a note paper pocket on the other; the blotter and the pocket may become the lining of the boards.

Once more the aim is to be accurate—accurate measuring, cutting, placing and neat pasting (thick flour paste is best at this stage). Do each exercise before the class, perhaps more than once in parts. The children had better see the road before they start off on it. Pride in creating a piece of fine work must be encouraged. These exercises are by no means simple for children. Where the teacher is convinced of the value of the training given in planning, control, design, learning from mistakes, etc., it is wonderful to see the avidity with which children will set to work after they know what is required of them; they will be quite ready to stay after school hours to complete a piece of work. By all means let them take their work home to show their mothers; most likely they will ask if they may do so.

It is a good idea to work out and duplicate a set of papers giving instructions for each exercise, and training children to use these

in building up their own exercises. It is a fine training, and although it means a great deal of work, it is well worth it.

THIRD STAGE HANDWORK EXERCISES LEADING TO BOOKBINDING

These exercises may prove more difficult to execute neatly and accurately than to bind a simple book. Nevertheless, they are a useful climax to the Preliminary Exercises. In these, a mistake is more easily rectified than in bookbinding proper. A fresh start may be made. Be prepared to link up the exercises with art wherever possible. There is plenty of opportunity for training in colour, design, accuracy, originality—no two children will produce exercises exactly alike.

Series of exercises illustrated on Plate IV. --

1. *Blotter, calendar, and writing pad*.—Required: one base 10 in. by 9 in. of 1 lb. strawboard, covered and lined with "made" paper, decorated with potato cuts, brush work, or lino cuts; 12 calendar cards, each 4 in. by 3½ in., finished in Indian ink, black or coloured; writing pad, 3½ in. by 2½ in.; blotting pad, base to be 8½ in. by 5½ in., finished as suggested in No. 3 of the Second Stage Exercises. Calendar cards and writing materials may be made into pads by being glued round the edges and then stuck on the base with glue.

2. *Blotter, calendar, and writing pad—folder model*.—This, when opened, measures 13½ in. by 8½ in. The blotter is 8½ in. by 6½ in.; the calendar cards are 5¼ in. by 5 in.; the writing pad is 5½ in. by 2½ in. The containing case may be whole, half bound or quarter bound, with 2 in. at least left between the boards. Outside and inside decoration should be done wherever possible. Cards, etc., should be stuck on or held in place by other practical and novel methods thought of by the teacher or the children.

3. *The well-known bank note case*.—Required: 4 pieces of 1 lb. strawboard,

each $3\frac{1}{2}$ in. by 6 in. These are to be covered with decorated paper. Retaining bands of $\frac{1}{2}$ in. or $\frac{3}{8}$ in. wide elastic or cotton tape are glued in place as in the diagram, and the boards are glued together in pairs, one pair to each half of the case.

4. *A case for school attendance slips.*—Required: 4 pieces of 1 lb. strawboard, 2 pieces each 6 in. by $4\frac{1}{2}$ in.; 2 pieces each 1 in. by $4\frac{1}{2}$ in.; coloured cloth for joints outside and inside. Decorated papers should be used wherever possible. The case is either whole bound, half bound or quarter bound. Each half consists of a long and short board, separated about $\frac{3}{4}$ in.; this allows of a hinge on each board; only one side may be hinged, in which case the unhinged board would be $7\frac{1}{4}$ in. by $4\frac{1}{2}$ in. The slips may be held by a bull-dog clip over the cloth joint holding the halves together.

5. *A slip-in refill case* (not illustrated).—Here, there is a departure from the practice hitherto observed. Required: 4 boards each $5\frac{1}{2}$ in. by $3\frac{3}{4}$ in. Two of these are joined with a cloth strip the same length as the boards. Each of these joined boards has put on it a $\frac{3}{4}$ in. glued border on the fore-edge, head and tail; the back edge is not glued. The other two untouched boards are similarly glued on three edges. These latter boards are placed on the joined ones, glued surfaces together, and nipped in the press. The result will be an open mouth on each pair. This case, as now made, has another cloth strip affixed to the boards on the side away from the first strip, turned over and rubbed down for about $\frac{3}{4}$ in. The outside and inside of the boards are finished with decorated papers. The book is a single-section book almost similar to that made in Exercise 1 of the Second Stage Exercises. The essential difference will be in the cloth piece right at the back. This, before being put on the book for sewing through, will be lined with a pasted or glued paper and so shaped that it easily slips into and out of the mouth left in the boards. It is necessary for it to be much less in length and breadth than the boards.

6. *A folding compendium.*—This is certainly rather an ambitious exercise for any child. The teacher would be well advised to make the article before asking the children to do so. There are pitfalls. Required: 3 boards, one 12 in. by 8 in. and two of 8 in. by 6 in. each; one piece of cloth $27\frac{1}{2}$ in. by $9\frac{1}{2}$ in. The pasted or glued cloth has placed on it, in the middle, the largest board, and to each side one of the smaller boards separated from the largest by about 1 in. The two joints are cloth lined. A blotting pad, made as in Exercise 3 of the Second Stage Exercises, is affixed to the middle board. A pad of note paper is glued on to one of the outer boards; the other smaller board is lined with a "made" paper and has attached to it some form of pocket to hold envelopes.

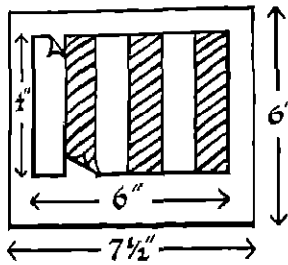
Glue may now be safely introduced.

For most of these exercises pressure will be necessary. A most useful piece of apparatus through all the bookcraft lessons, elementary and advanced, will be an iron office letter press, now largely obsolete. These may be picked up cheaply at sales or in a broker's yard. The exercises are placed between blanket boards (which are pieces of 3-ply wood covered with blanket materials glued on) before being subjected to pressure in the press.

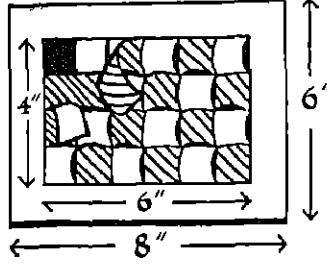
BOOK CRAFTS—1

Folding and stitching.—For a class of forty, three reams of imperial octavo drawing paper. Imperial size is 30 in. by 22 in. Imperial octavo is $\frac{1}{4}$ of 30 in. and $\frac{1}{2}$ of 22 in., that is, $7\frac{1}{2}$ in. by 11 in.

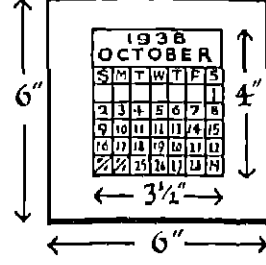
Children should use plain white cartridge paper for their first few books. Children will make mistakes—wrong cutting of the edges of printed books may be irremediable, while a plain paper book may be cut more than once and the process of edge cutting and the need for care learned at the same time. The teacher accepts no bad work at any stage, and this must be emphasised



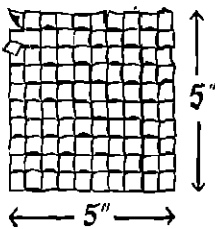
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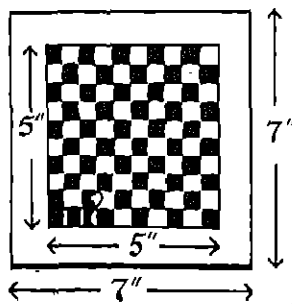
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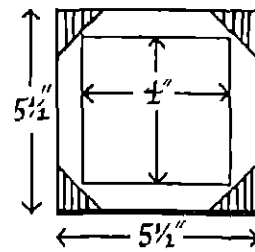
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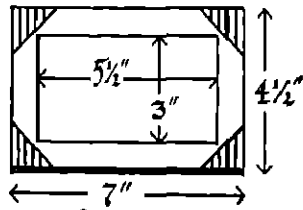
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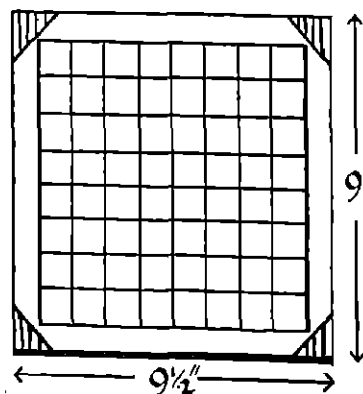
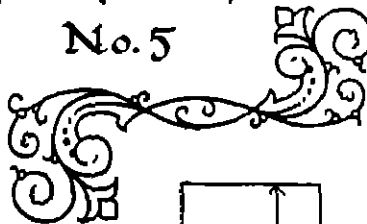
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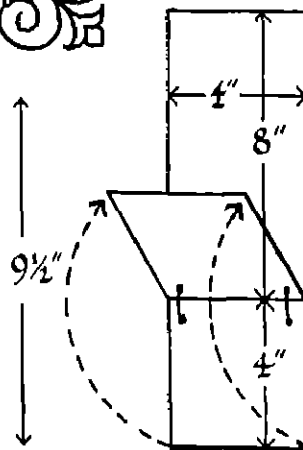
No. 6



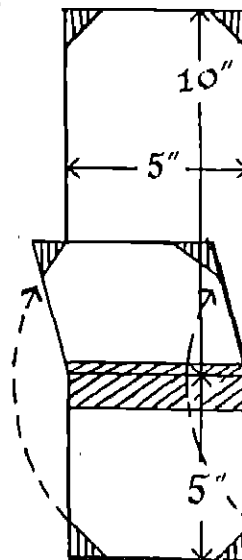
No. 7a.



No. 7b.



No. 9



No. 10

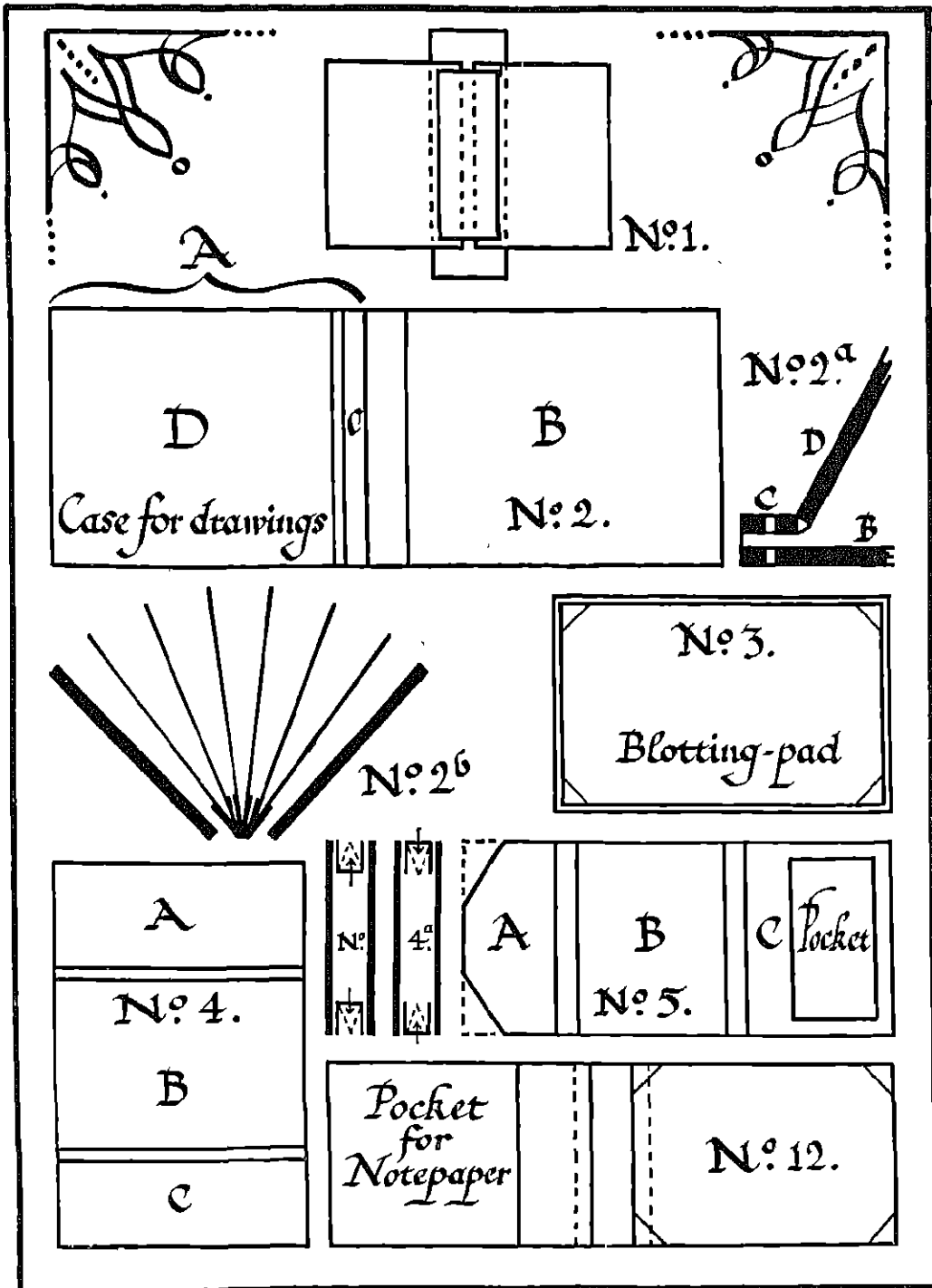
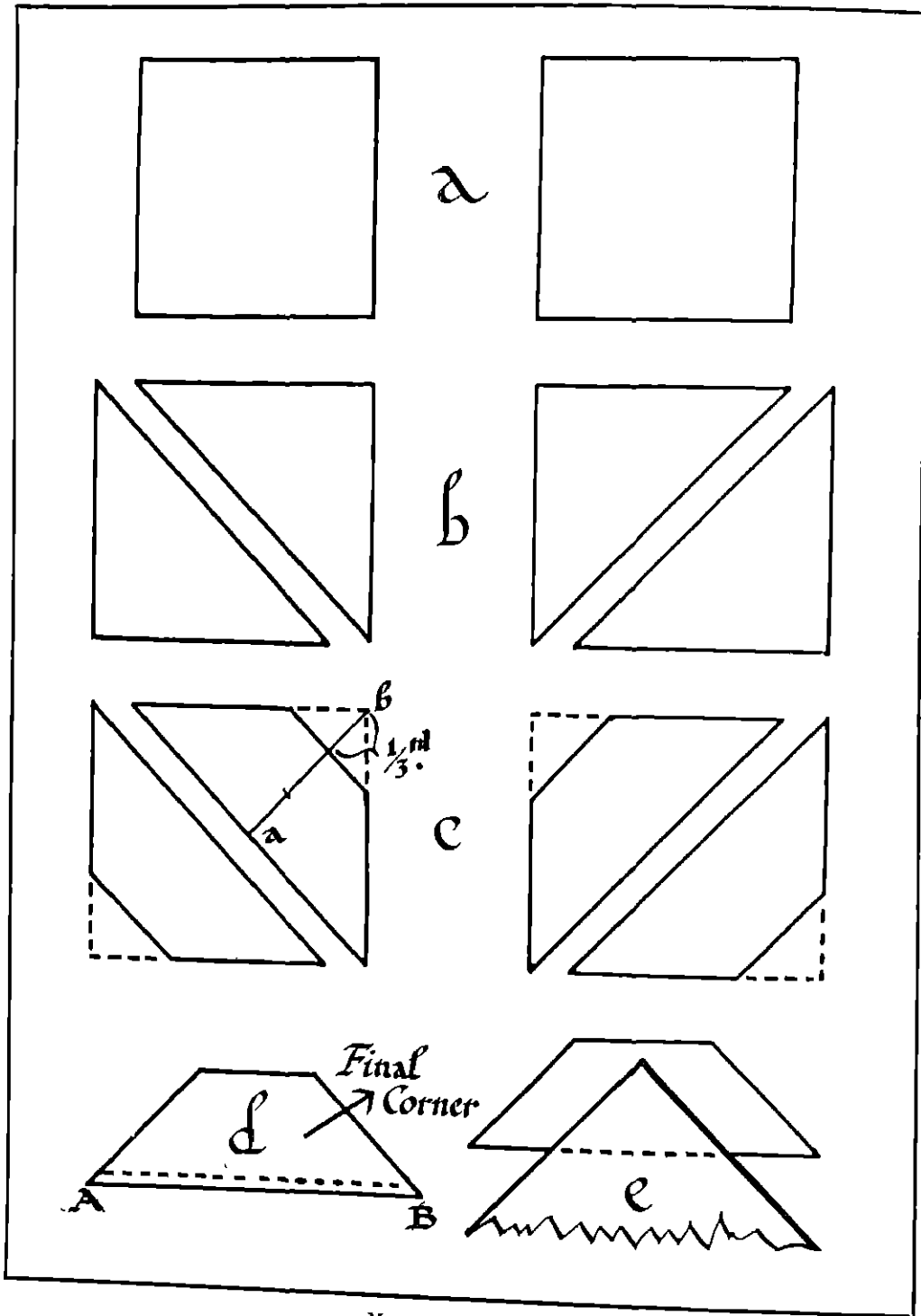
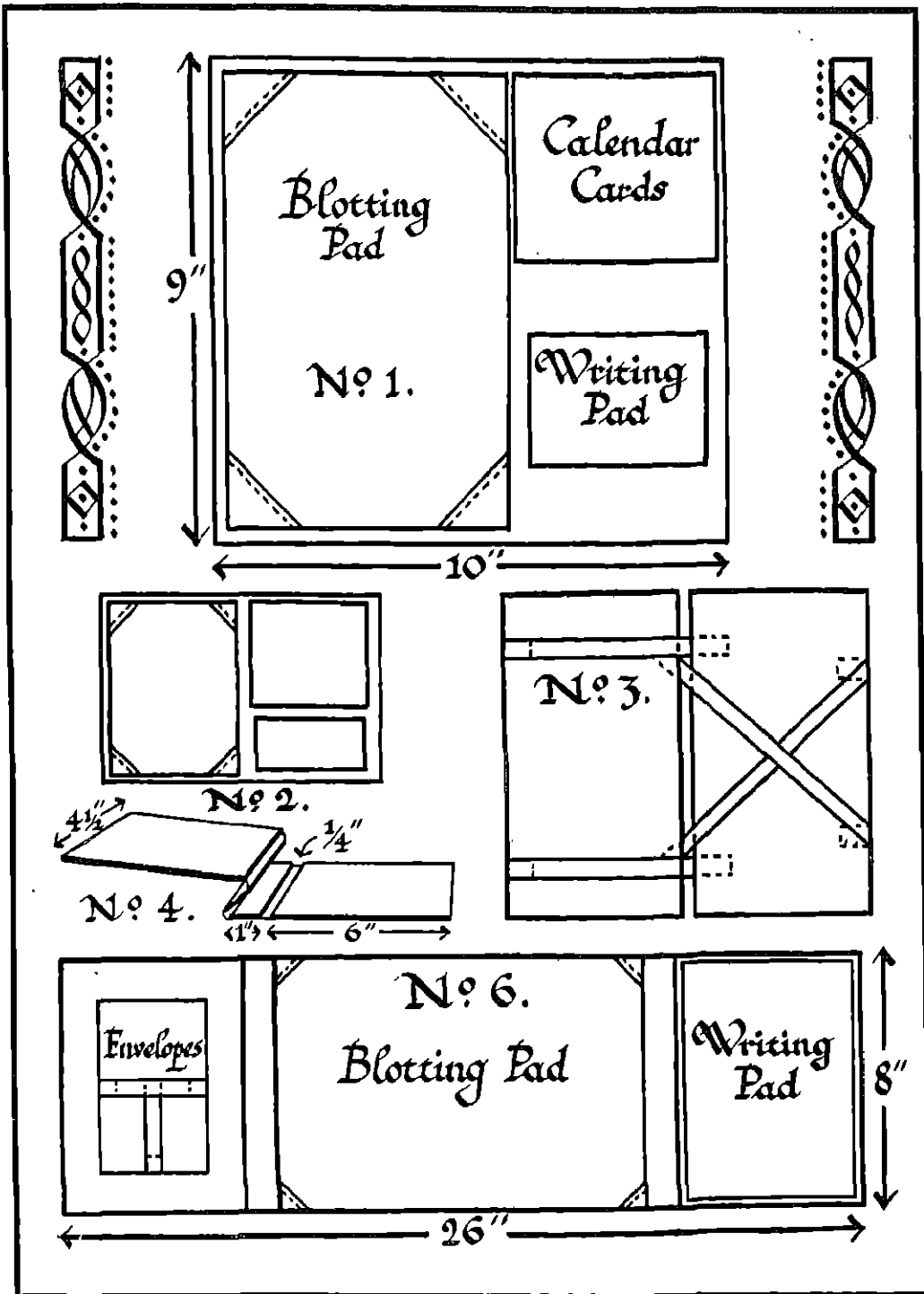


PLATE III



MAKING A CORNER



THIRD STAGE HANDWORK EXERCISES LEADING TO BOOKBINDING

from the start. It is better to lose some sheets of paper than to allow any careless work to go into the finished book.

Each child folds accurately thirty-two sheets in two; these sheets are put together in fours to make a *section*. There are thus eight sections in each book. With the knocking-down iron on the end of the lying press (Plate V, Figs. 2 and 3), or on the knees (Plate V, Fig. 4), the teacher knocks-down a whole book at once, or the sections in pairs, or separately for the pupils. Later they will do their own. After they have been knocked-down, the sections of one, two or even three books are put together between pieces of board into the lying press (Plate V, Fig. 5.) The boards should be about $\frac{1}{4}$ in. below the backs of the books. Here they are marked-up for three tapes, using a try-square and saw. The saw kerfs—or, more commonly, saw cuts—must not be too close to the tapes or the poor sewing of beginners will cause the tapes to crumple. A space of about $\frac{1}{16}$ in. is sufficient. By opening a section show how deep the saw cuts must be (Plate V, Fig. 6). A neat cut just shows. Explain that their purpose is to save having to push the needle through a lot of paper.

An alternative method of marking-up would be to use a pencil instead of the saw, and afterwards, push a needle through the pencil marks to the inside of the section.

Show how the tapes are cut on the cross, and set a child to cut enough for the whole class.

The book, as if completed, is left on the bench with the back of the book to the outside of the bench or table; Plate XIX, Fig. 7. The whole book is turned on an imaginary hinge on the fore-edge: the side of the book which was formerly uppermost is now in contact with the bench top; Plate XIX, Fig. 8. In sewing, the sections must remain on the bench. Sections are not to be sewn while holding them up in the air.

No frames are required for this style of sewing. The tape used must be bookbinders' stiffened tape, not the cotton

variety used for needlework. Pass the thread along through the first section; insert the tapes; tuck them underneath. They will stand upright without assistance. While some pupils are sewing, the teacher should be knocking-down and marking-up for others. At the right moment show how the second section is sewn all along, "tying" to the first section at each tape crossing (Plate XIX, Fig. 9), and knotting with an ordinary knot at the end of section two.

By degrees the whole class will have sewn on sections one and two.

The sewing of section three is shown; each time the needle comes out of the section it is passed under the thread of the previous section near where the needle is next entering its section.

The *kettle stitch* is shown a number of times—the needle is to go between the sections broadside and not point first. If the latter method is employed, the needle will be more likely to enter a section and tearing will result.

The sewing demonstration is now complete. It will take at least sixty to seventy minutes. This completes the first lesson. Each child puts his or her name on the work. In order that the children shall look forward to the next lesson a completed book might be shown, the endpapers pointed out and a promise made to show how these are made and attached to the book.

It is useless to attempt bookbinding without proper apparatus. Bone folders, to be used for creasing the sections, may be made from toothbrush handles, shaped with a file or on a grindstone—or better still, bought. At least four laying presses, or lying presses, will be required. These are all the time in use by one section of the class. A number of firms provide presses very suitable for school use, priced about one guinea. The plough, to be mentioned later, must have a sliding knife.

Book repairing is an expert's job and had best be left till about the third year.

BOOK CRAFTS—II

Endpapers.—In the sixty to seventy minutes allotted to the first lesson, the quicker children will have completed the sewing of the sections. As "the best way to learn is to teach," it is a very good plan to set those quicker ones to supervise, temporarily, the work of some of the slower ones. The child is probably a better teacher of children than is the adult. Children like teaching.

The teacher's remarks to the children as they bring up their finished work for inspection may be most helpful to others who are near by and can listen. "Very well sewn; notice how solid your book feels, it does not wobble about," "Too tightly sewn; instead of being flat, the back of your book is concave; probably you pulled the kettle stitch too tightly," "Sewing too loose; notice how the sections can be moved up and down on one another."

Once again—and this must be repeated again and again—accept no careless work. If a book is badly sewn it must be undone and resewn. One of the most important reasons for attempting bookbinding at all is that it teaches accuracy; and a degree of accuracy is being sought which a child can give.

A promise was made in the first lesson to show how the endpapers—more often called "fancy" papers—are made and fixed to the boards (commonly called the cover or case). Before beginning to put coloured endpapers of any kind on a book, it is essential to know what colour or colours are being used for the cloth covering. Turn to Lesson XI and carry out the suggestion there made as to mounting combinations of the various coloured cloths available. Children can accept or reject one of these combinations—in either case they are being critical and so are progressing.

It is suggested that specimen pieces, postcard size ($5\frac{1}{2}$ in. by $3\frac{1}{2}$ in.), of the following types of endpapers, etc., be mounted, framed behind glass, and hung in the craft room. (See pages 26–38.)

- Plate VI. Fig. 1. Colour Combinations.
 Fig. 2. Simple Wash.
 Fig. 3. Stippled Coloured Paste.
 Fig. 4. Combed Coloured Paste.
 Plate VII. Fig. 5. Coloured Paste
 "Thumped."
 Fig. 6. Colour Blending.
 Fig. 7. Oil Bath Method.
 Fig. 8. Stick Printing.
 Plate VIII. Fig. 9. Edge Stencilling.
 Fig. 10. Edge Stencilling showing method.
 Plate IX. Fig. 11. Interior Stencilling.
 Plate X. Fig. 12. Potato Cuts.
 Plate XI. Fig. 13. Lino Blocks.
 Fig. 14. Free Brush Work.
 Fig. 15. Cover Design.
 Fig. 16. Wrapper Design.
 Plate XII. Fig. 17. Suggestions for Lino Cuts.
 Plate XIII. Fig. 18. Pictorial Work in Water Colour.
 Plate XIV. Fig. 19. Suggestions for Titling.
 Plate XV. Fig. 20. Pen and Ink Sketches.
 Plate XVI. Fig. 21. Pastel Work.
 Plate XVII. Fig. 22. The Farmer
 Plate XVIII. Fig. 23. The Beggarman.

PLATES VI—XIV ARE PRODUCED AS CLASS PICTURES, NOS. 118 TO 126 IN THE PORTFOLIO.

Simple Wash.—The simplest method is where a wash of water colour is uniformly spread with a small sponge or pledget of cotton wool, all over an imp. 4to. sheet (15 in. by 11 in.), so that when dry and cut in two there are two 8vo. sheets which match very well. This is better than trying to do two 8vo. sheets separately; (see Plate VI, Fig. 2 and Class Picture No. 118 in the Portfolio).

Stippled Coloured Paste.—Some fairly thick flour paste is coloured by adding coloured water—not by adding dry powder direct. Tempera colours are splendid for the purpose. This coloured paste is taken up by a large brush, 1 in. to 2 in. diameter, and stippled all over the paper, the brush being given a

perpendicular action, as shown in Plate XIX, Fig. 10. Another colour may be stippled over or between the other, using different brushes; (see Plate VI, Fig. 3 and Class Picture No. 118 in the Portfolio).

Combed Coloured Paste.—When the colour, or colours, have been applied as above, a good effect may be produced by using a strawboard "comb," with "teeth" not necessarily uniform in width, to draw lines in the same or varying directions; (see Plate XIX, Fig. 11). Good duplicates of any of the above may be had by rubbing a damped sheet into contact before the coloured one has had time to dry; (see Plate VI, Fig. 4 and Class Picture No. 118 in the Portfolio).

Coloured Paste "Thumped."—The two coloured pastes may be put on different sheets, the two placed face to face and thumped with the hand or a pad made of a large duster. The result is a splashing of the colour, often very effective; (see Plate VII, Fig. 5, and Class Picture No. 119 in the Portfolio).

Colour blending.—This is a very simple but effective manner of making endpapers and can be used in the very early stages. There are two types; (a) blending different tints of one colour; (b) blending different colours.

(a) *Blending the same colour.* The drawing paper should be wetted by being held under the tap or dipping into a large photographic dish, and used while in a very damp condition, thus enabling the colour to run and blend more easily. With a large brush, not less than size 8, a little strong colour is painted in lines, roughly parallel, though not necessarily straight, across the paper. The more pleasing effect is when they are not straight. Owing to the damp condition of the paper the colour should run freely, producing a "pattern." The "lines" of colour can be assisted in running by adding a little clean water between the lines.

(b) *Blending of different colours.* There is an unlimited choice and variety. The procedure is the same as for (a), except for

the use of different colours. (See Plate VII, Fig. 6, and Class Picture No. 119 in the Portfolio).

When dry, all the above may be ironed with a fairly hot iron, the papers gaining by having a matte surface. Starch may be used instead of flour, when the result will be a higher gloss after ironing.

The Oil Bath Method.—Some cold water is placed in a large photographic dish of the enamelled type as used for 15 in. by 12 in. prints, and some warm water is added to a depth of about 1 in. If too warm water is put in the dish at once, the bottom of the dish might become convex. To all this is added a few brushfuls of warm glue from the glue pot. This forms a size.

A selection of colours ground in oil will be required—artists' tube colours give a greater selection, though the cruder kind, bought at the colour merchant's will do. About 1 in. of colour is pressed from a tube into a bottle, some turpentine is added and the mixture is well shaken. Some form of sprinkler top, bought for 1d. from any chain stores, is also needed. The colour is sprinkled on the surface of the size. The coloured oil floats and spreads.

Another contrasting or analogous colour, as shown by the colour circle, may be added, and patterns drawn with a knitting needle or by a number of pins held between two pieces of glued strawboard.

The first colour thrown on spreads most. Too much oil results in too much spreading; if too little oil is used the colour falls to the bottom. Paraffin may be used instead of turpentine, but both must not be used together. A sheet of paper is held as in Plate XIX, Fig. 12, and dropped. Care should be taken to see that no air bubbles are imprisoned, or white patches will result. Drop on a diagonal of the paper and let the corners fall away therefrom. When it is desired to clean off the colour in order that a fresh combination may be tried, it is best to use pieces of newspaper. Two colours are perhaps best; do not neglect black. Placed round on the heated school pipes,

the sheets soon dry. A number should be made and stored (see Plate VII, Fig 7 and Class Picture No. 119 in the Portfolio).

Stick Printing.—This is yet another method of making beautiful endpapers. It may be considered a good introduction to original design work. At first, bought sets should be used. These contain circles, squares, triangles, rectangles, etc., and these surfaces again cut across. In using these it will gradually break in upon the child that he is building up something he likes very much. When he has combined these shapes and used on the same sheet different colours which harmonise, he is undoubtedly progressing. Some of the class—probably about twenty per cent—will later on produce original brush work which will be astonishingly fine. With the aid of files of different shapes and sizes, original forms may be made on short lengths of dowel rods, etc. Tube water colours or dry powder colour dissolved in a little water and either kind mixed with flour paste gives a colour with a good "body." A piece of flannel soaked with colour and lying in a saucer makes an effective pad (see Plate VII, Fig. 8 and Class Picture No. 119 in the Portfolio).

Edge Stencilling.—Endpapers produced by a method known as edge stencilling can be beautiful (see Plate XX, Fig. 13). The edge stencil, at present under the left hand, began its career at the top, or, as we look at it, at the right-hand end of the paper. Here the colour, showing dark, was stencilled on to the paper. The stencil was moved down a marked distance and the same operation carried out; but in addition, an almost dry brush was used to gradate the colour up to the dark of the first strip. Once again it must be repeated,—an almost dry brush is used. The process is repeated to the end of the paper. A dome-shaped, rather than a flat brush, is better for the flicking, gradating action. The stencilling may be done at an angle. More than one colour and more than one stencil may be used on the same sheet (see Plate VIII and Fig. 9 and Class Picture No. 120 in the Portfolio).

Plate VIII, Fig. 10, shows a number of edge stencils in position for the next line, and the results of their previous use.

Interior Stencilling.—This is the more familiar type of stencilling. A suitable unit may be repeated (1) along parallel lines; (2) rotated clockwise in a circle, square, triangle or any regular polygon; (3) inverted within a rectangle (see Plate XX, Fig. 14).

For the stencil, use ordinary cartridge paper, which has had applied to it a light coat of French polish. This will help to resist the action of water and so the stencil will last longer. It also allows the stencil to be washed with a sponge after use and stored for future use, if so desired. An endless variety is possible, starting with straight lines and finishing with curves or combinations of both. The lines need not necessarily run horizontally across the paper (see Plate IX and Class Picture No. 121 in the Portfolio).

Potato Cuts.—Simple designs cut on a flat piece of potato and cleanly repeated over a sheet give a pleasing result. The chance of turning over or inverting the potato must be carefully guarded against. Apply the colour with a brush or from a pad. A piece of 3-ply wood, covered with blanket (blanket boards) makes a useful cushion while the design is being impressed on the paper (see Plate X and Class Picture No. 122 in the Portfolio).

Lino Blocks.—The use of lino blocks for repeating a pattern is too well known to need elaboration here. Briefly, (1) a design is pencilled, painted or traced on to a piece of lino, the plain rubbery type of lino being best; (2) the design is cut around or away, using a V-tool for narrow spaces, a small penknife for straight lines, a gouge for cleaning away larger areas.

In cutting up lino into shapes for use, first cut the canvas at the back, and it will be found that the lino snaps surprisingly straight. Working the other side first is not satisfactory. Cutting the design before mounting (Plate XX, Fig. 17) may result

in injury to inexperienced hands. It is better to stick the piece of lino, using glue, to a piece of timber 2 in. to 3 in. high, and with ends similar in shape to the piece of lino. During cutting, the mounted lino may be locked in a vice and both hands are then free to control the tools. The operator, for greater ease, control and accuracy in cutting, may revolve himself or the block.

Having cut the design, it is next inked. This is best done with a small squeegee, which has been rolled a number of times over a thin film of ink spread on a piece of plate glass (see Plate XX, Fig. 18.) After inking, it is sighted over its next position, lowered into place and pressure applied with both hands and shoulders as in Plate XXI, Fig. 19.

A useful guide is shown in Plate XXI, Figs. 20 and 21. It consists of a straight-edge of $\frac{1}{2}$ in. to $\frac{3}{4}$ in. high, having attached at each end a piece of tin with a hole through which passes a drawing pin to keep the rod in position. Its advantages will be obvious.

It may happen that much larger lino blocks are being used for endpapers. They may be 5 in. by 4 in., or even larger. One I have seen of Durham Cathedral comes to mind. It showed the river bank, the river, the bridge, some houses, and behind and dominating all, a beautiful view of the cathedral. Such a size had best be transferred with the aid of the letter press and blanket boards. Too great pressure must be avoided.

In a lino block but little recession of tone can be suggested. One has to depend on recession of line, hence the drawing must be reasonably correct. It is unwise to try to include too many planes—perhaps three can be handled by the expert. Too great detail is not expected from the medium. Masses are more sought for.

For all lino blocks a thin, strong, rather tough paper is best. If necessary, and before use as an endpaper, it may be lined; (see Plate XI, Fig. 13 and Class Picture No. 123 in the Portfolio). Suggestions for lino cuts are shown in Plate XII and Class Picture No. 124 in the Portfolio.

Free Brush Work.—In this type of work wonders are done by children of twelve to fourteen years old. It is the most important of all; the other stages have been but a training for this stage.

The best child, boy or girl, is taken in hand by the teacher and shown how to begin a simple drop pattern, counterchange pattern, or chequer pattern of, perhaps, postcard size. Do not attempt large sheets—it is too much to expect. Variety adds zest to the work. Other children will come round to see this new work being done and will ask to be allowed to try it. Their efforts are mounted as suggested in Lesson XII. The seed has been sown in good ground and soon will be bearing fruit which is a delight to behold. Their very inexperience makes children more successful and original in this type of work than many adults. They do not worry if they are "right;" they know no "laws;" they do just as they please, never stopping to think if the work will be admired. The result is their own and consequently much more worthy of admiration than if copied. They deserve every encouragement. It is a fine form of applied art, and may well occupy the art and craft time of those children who are best at the work.

Shiny cloth is unsuitable. A matte surface gives better results, as the water colours hold better on a cloth which has some "tooth." When finished, the colours may be fixed by spraying with a fixative or being lightly painted over with a solution of bleached shellac in methylated spirit (see Plate XI, Fig. 14 and Class Picture No. 123 in the Portfolio).

Pictorial Work in Water Colours.—Perhaps the most ambitious of all endpapers are those wherein attempts are made at pictorial work in water colours, or pastels, pen and ink, or brush and ink (see Plates XIII, XV, and XVI and Class Picture No. 125 in the Portfolio).

I have known children living in industrial areas, who drew really good pictures of house roofs, chimney pots, smoke and

factory chimneys beyond; of a weigh-bridge, horse, cart and coal, and tall cooling towers beyond; of a high curving bridge, supported by lovely arches and being crossed by a laden train. These were in monochrome. The children could see from the school windows the recession of tone—the darkest shadows nearest and the tops of the distant hills almost merging into the sky. This atmosphere had to be sought for while doing the painting. The children were busy all the time trying to visualise what they wished the finished article to be. Those of my readers who are workers in bromoil or bromoil transfer will the better understand how the thoughts of these children will run.

Every sensible person will welcome the organising of parties for outdoor sketching.¹ Whether the school be in the city, town or country, subjects abound for the "seeing" eye. Children living near the Lake District or some similar country will soon see majesty in the trees in Friar's Crag, and from its west side they will make a picture including fencing, rushes, wavelets, islands and faint hills. What of the Blea Tarn with the Langdales for a background? A lonely ruined monastery by a rushy river makes a fitting subject for "The Hermit's Home."

There is no end to the list one might make up. As always, the chief factor is the teacher. If he or she be an artist, children will do surprising things—surprising at least to those people who cannot execute similar things.

The glory of a landscape in the eyes of most people is in the colour. Lines are not so obvious. Composition is not soon appreciated, therefore monochrome work is important. Full advantage should be taken of local exhibitions of pictures, paintings, and photographs. Before the visits there can be a talk at school. The local photographic society or a well-known amateur will be quite willing to send a collection of enlargements which can be displayed and criticised. The teacher goes from one to

another saying which he likes and why. He must remember the photographer does not take the photograph to please the critic, but because he sees some beauty of line or tone: colour, he tries to forget. This beauty, though often evasive, must be sought for. Not many advanced amateurs work thoughtlessly. Again it must be pointed out to the children that "what is one man's meat is another man's poison," and allowance must be made for this. After a time the children themselves become critical and if asked to pick out the six "best," will make a good and well considered choice. During the visit to the picture gallery or museum, the procedure should be that all walk quietly round, absorbing the "atmosphere." A paper vote may be taken silently and the favourite pictures studied at greater length on the spot, and later on talked about at school. Children will be getting interested and will visit shows on their own account and examine critically. It has all grown out of their art work at school and more especially out of the art work which has been purposeful, as have been their pictorial endpapers, whatever the medium—water colour, pen and ink, brush or pastel.

There is an accepted Pickwick, Weller, and Fat Boy. Why not put one of these on each page of an endpaper? Other examples are a Farmer (Plate XVII) and a Beggarman (Plate XVIII). The list is endless.

I grant that there are difficulties, but for the able teacher there are no impossibilities, and many compensations. All good work is something which will stretch tutor and children. Within the reach of most people will be some "corner" to which children can be brought and shown how to put down on paper what they see.

Not many years ago successful book-binding in a school consisted in merely binding a book, and omitting all consideration of any application of art work. Even the teacher perhaps had done well if he put the title on in gold! It was an

¹ For an article on *Sketching Out of Doors* consult the Index in this Volume.

"advanced" school where children were taught how and allowed to use foil. Our best schools to-day, early on, marry the technique of the craft to art, and see to it that divorce is ever after unknown.

The following incident at a recent Education Week Exhibition is illuminating. On a stall was a collection of books bound in cloth, mainly quarter binding. A visiting teacher who had taught bookbinding for many years and evidently anxious to improve his knowledge by inquiry and acquisition, candidly expressed his doubt that the work he saw was the work of children. The technique, he admitted, was possible, but the art work was not. Some beautiful brush-work designs had been done on the cases and on the covering jackets (Plate XI, Fig. 16) and endpapers. This had been foreseen, and in a neighbouring room in charge of their teachers, were children demonstrating in woodwork, metal-work, brushmaking, toymaking and book-binding. He was invited to go there and see for himself. He returned convinced and delighted.

Children will follow the right teacher to the top of any Mount Everest. Tragedies occur when the guide too soon considers himself qualified to lead.

Advance in the craft is slow and restricted where different teachers are responsible for the two sides—if one may use the term "sides" at all—the technical and the aesthetic. The ideal arrangement is where the craft lesson is an art lesson for some of the children, and the art lesson is in part craft. Demands are made that art be "applied art." It may well happen that the only art done in a school is that in connection with the bookbinding. It is of very great importance that the same teacher should be responsible for the art and craft schemes of the school.

In every art and craft room should be a colour wheel, large enough to be seen from any part of the room. Its big lessons—the harmonising and contrasting of

colours—are explained to all comers. As complete a knowledge as possible of its uses is gradually acquired. (See Class Picture No. 133.)

BOOK CRAFTS—III

The zigzag endpaper.—The second talk finished with a promise to show how fancy papers, properly called endpapers, are prepared for attaching to the book, and how they are fixed into position. If desirable, the fancy paper may be just tipped on as shown in Plate XXI, Fig. 22. The type of endpaper which is about to be made is called the zigzag.

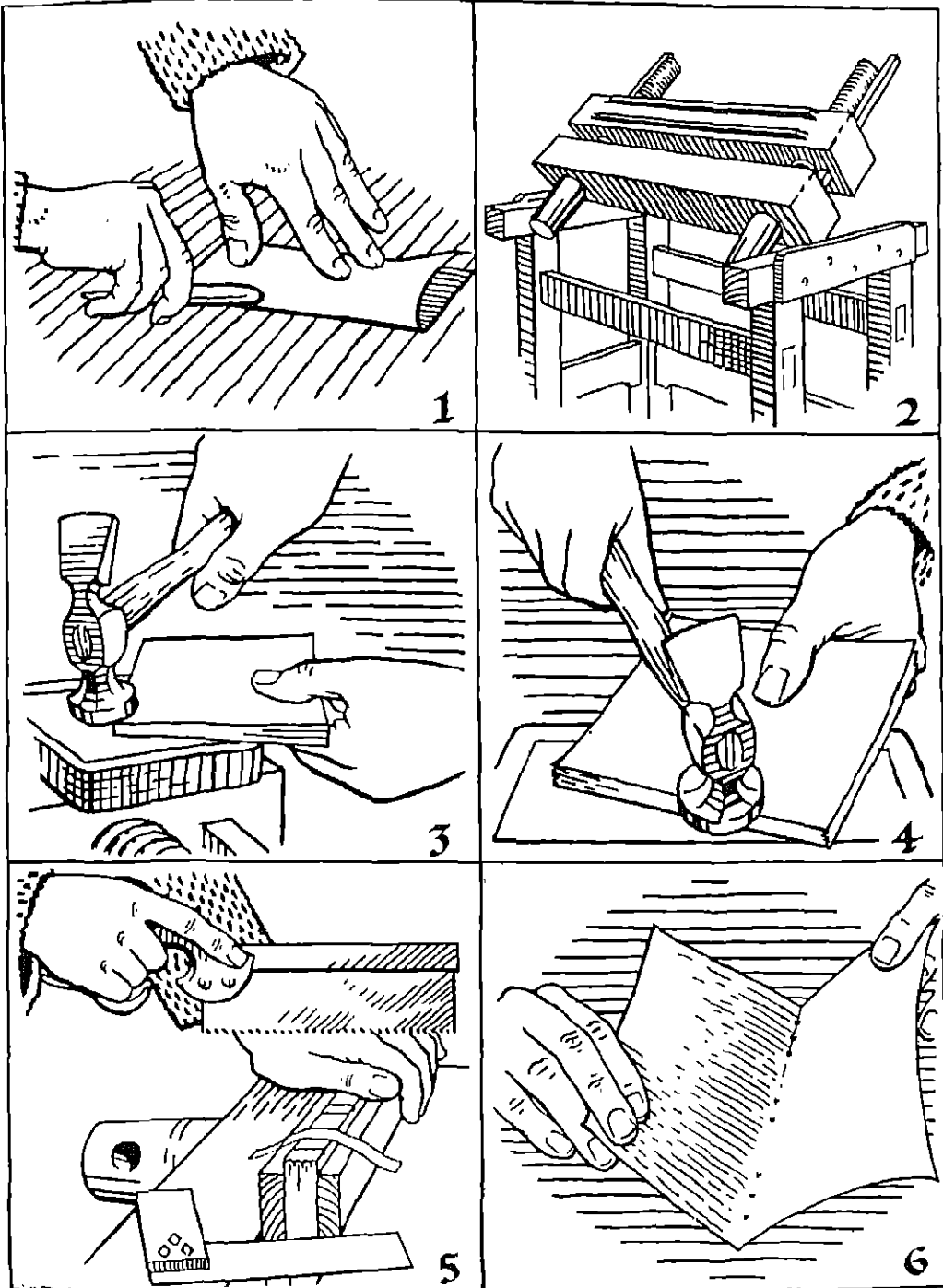
Two folded white sheets of paper, and two folded fancy sheets with the fancy sides inside the fold, are required. For this unprinted book the whites may be the same size as the sheets used to form the sections. As will be seen when sewn on, the width of these from back to fore-edge is less than the width of the sections, and an amount not usually permissible in a printed book must be cut off to get a neat fore-edge. The dimensions of the paper used to form the endpaper must not, when on the book, be less than the dimensions of the book. As shown in Plate XXI, Fig. 23, the plain white papers are marked on both sides of each end, about $\frac{3}{16}$ in. from the fold, using a pair of dividers or tight compasses. Once more remember to mark both sides.

Form a little "stairs" with these two whites and two fancy papers as shown in Plate XXI, Fig. 24. On scrap newspaper, place a white paper with the fold away from you; on this, up to marks made with the dividers, place a fancy paper; next a white paper, showing as much of the fancy as of the first white piece; next a fancy placed up the marks on the white; last, on top of all four, place a straight-edged paper so that a uniform "stairs" shows.

The "tread" of the "stairs" has now to be glued. The glue brush, very lightly charged with glue, is used in such a way that the points of the bristles drive the

(continued on p. 42)

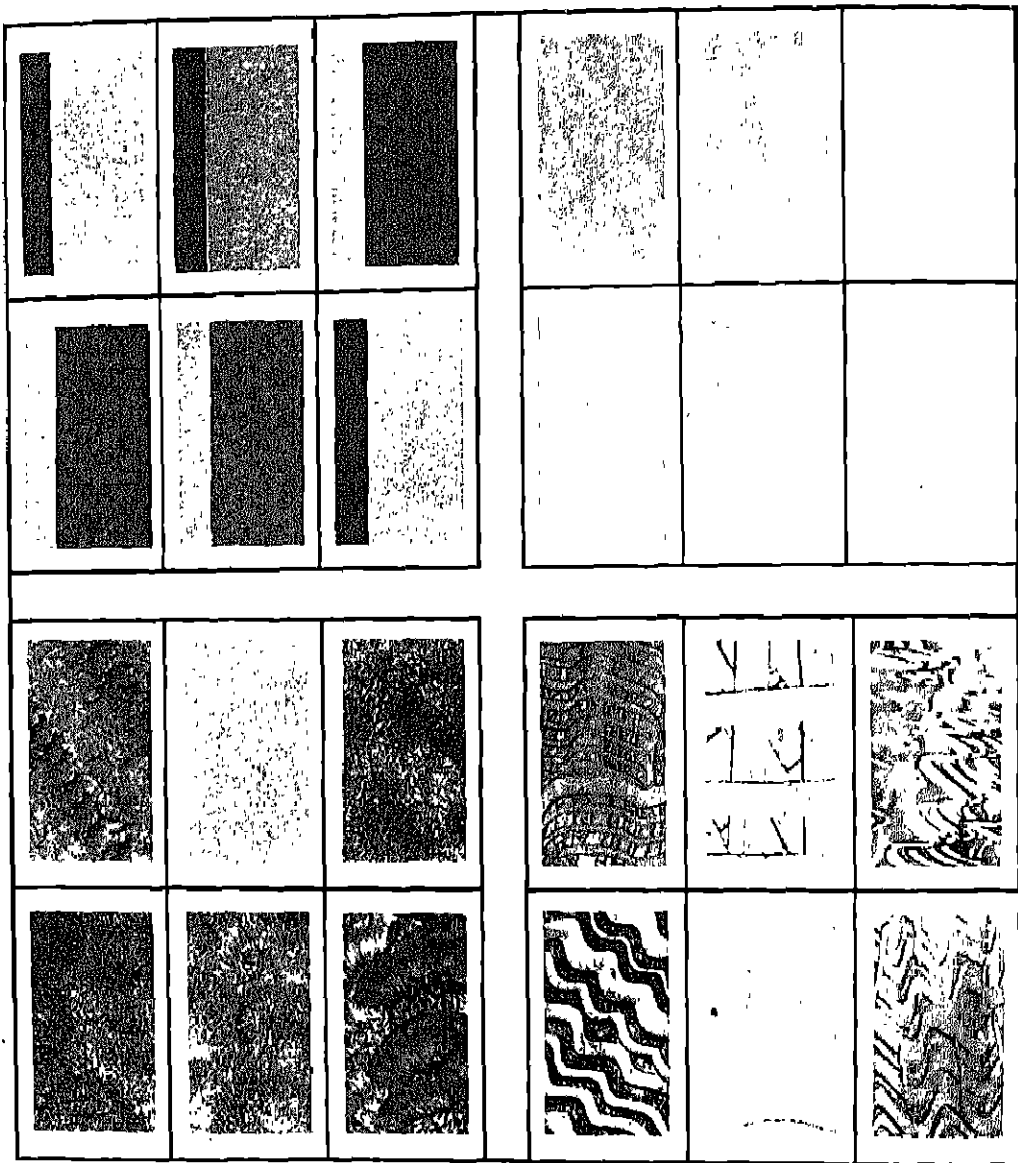
PLATE V



1. FOLDING SINGLE SHEET
3. KNOCKING DOWN ON PRESS
5. MARKING UP FOR SEWING

2. LYING PRESS AND STAND
4. KNOCKING DOWN ON KNEES
6. SAW KERFS JUST SHOWING

PLATE VI



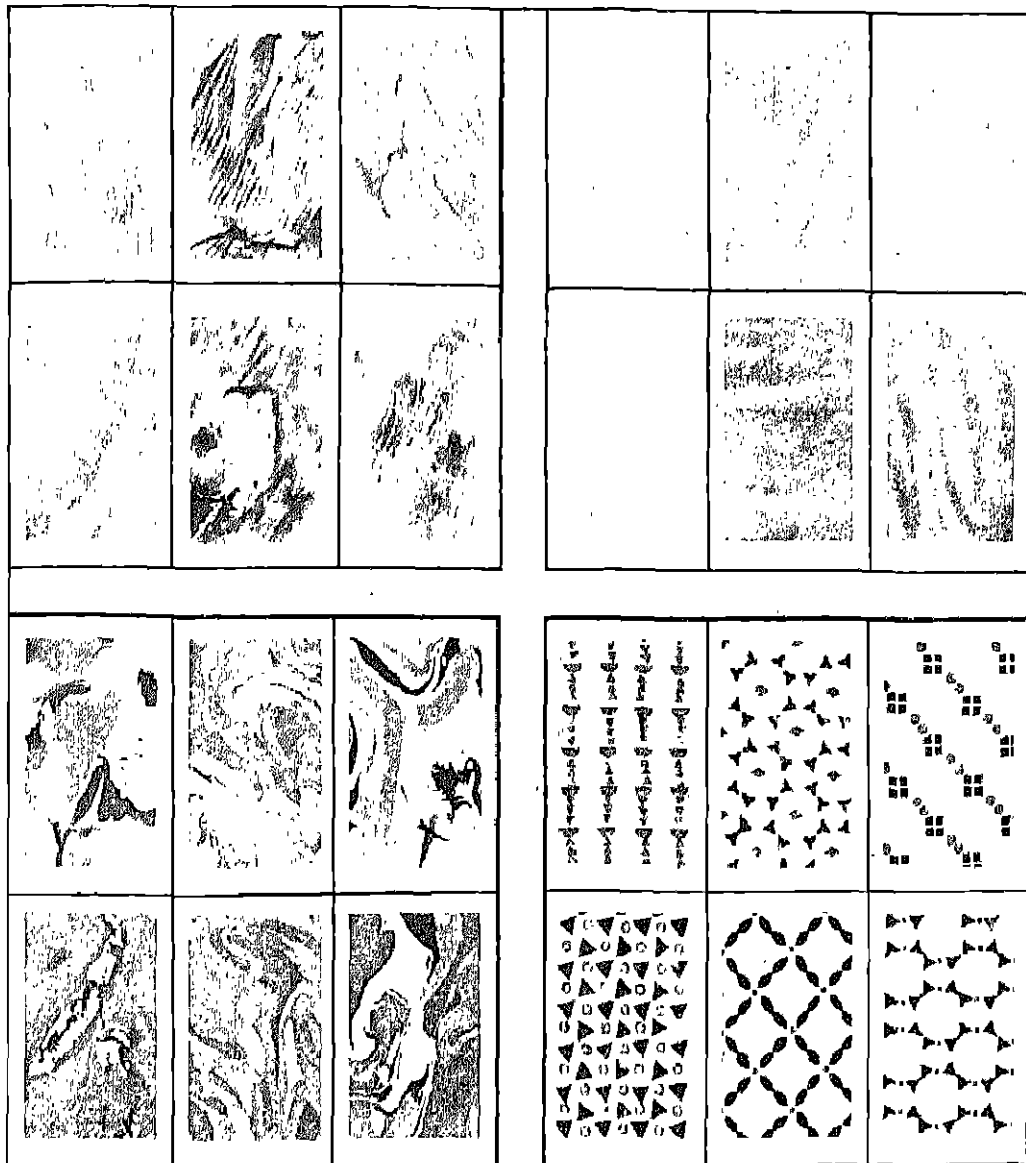
ENDPAPERS

(Class Picture No. 118 in the Portfolio.)

1. COLOUR COMBINATIONS
3. STIPPLED COLOURED PASTE

2. SIMPLE WASH
4. COMBED COLOURED PASTE

PLATE VII



ENDPAPERS

(Class Picture No. 119 in the Portfolio.)

5. COLOURED PASTE "THUMPED"
7. OIL BATH METHOD

6. COLOUR BLENDING
8. STICK PRINTING

PLATE VIII

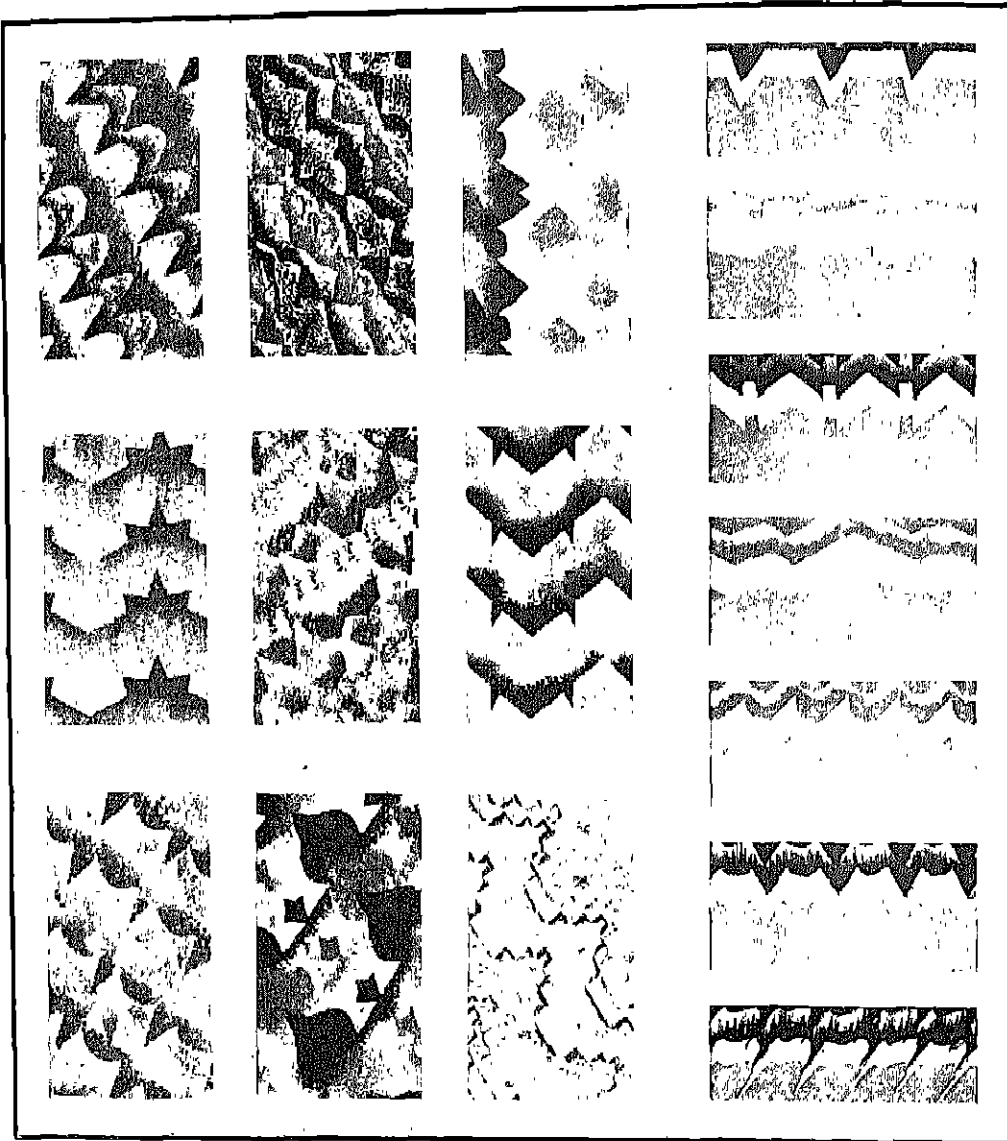


FIG. 9.
EDGE STENCILLING

(Class Picture No. 120 in the Portfolio.)

FIG. 10.
METHOD OF
EDGE STENCILLING

PLATE IX

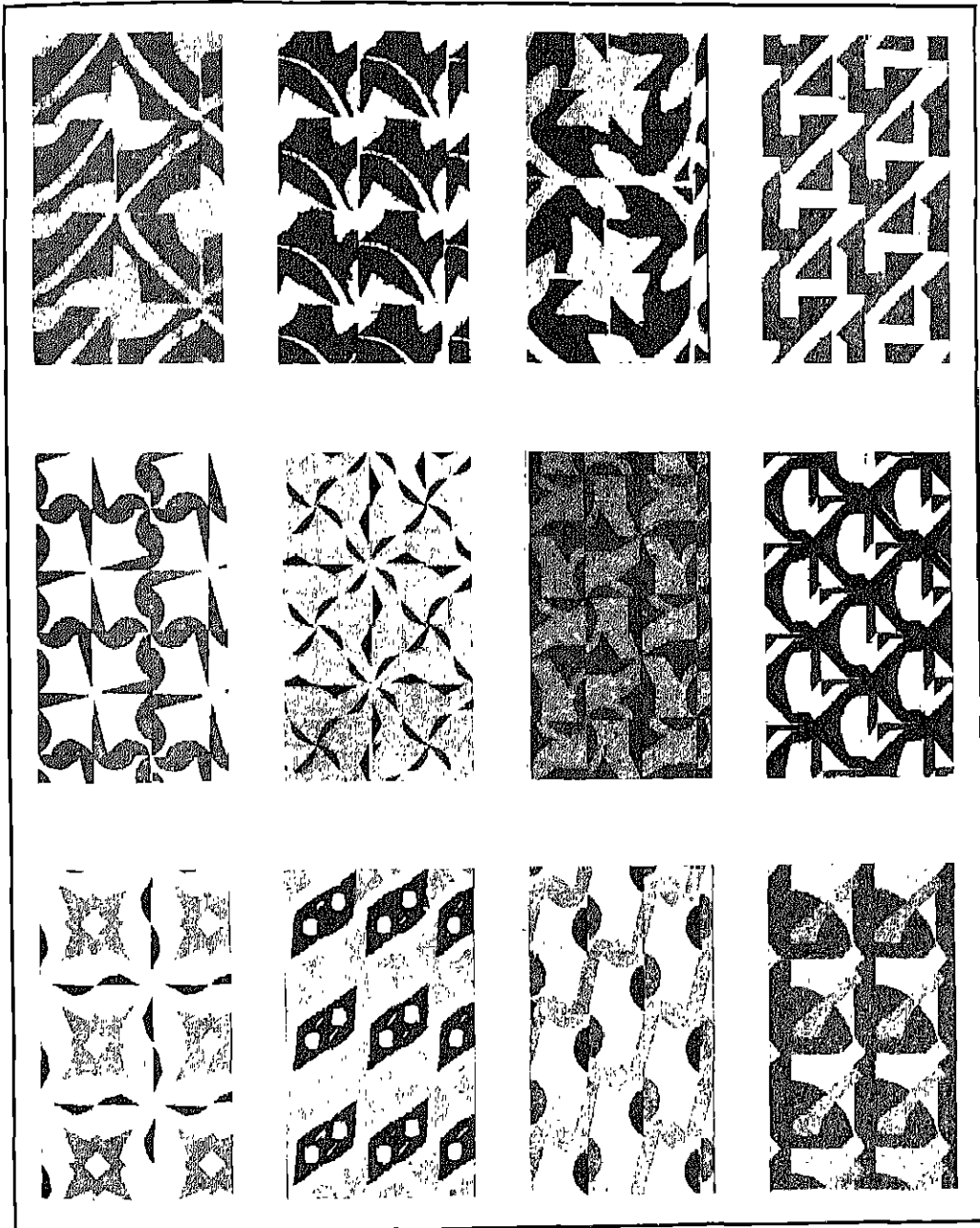


FIG. 11
INTERIOR STENCILLING
(Class Picture No. 121 in the Portfolio.)

PLATE X

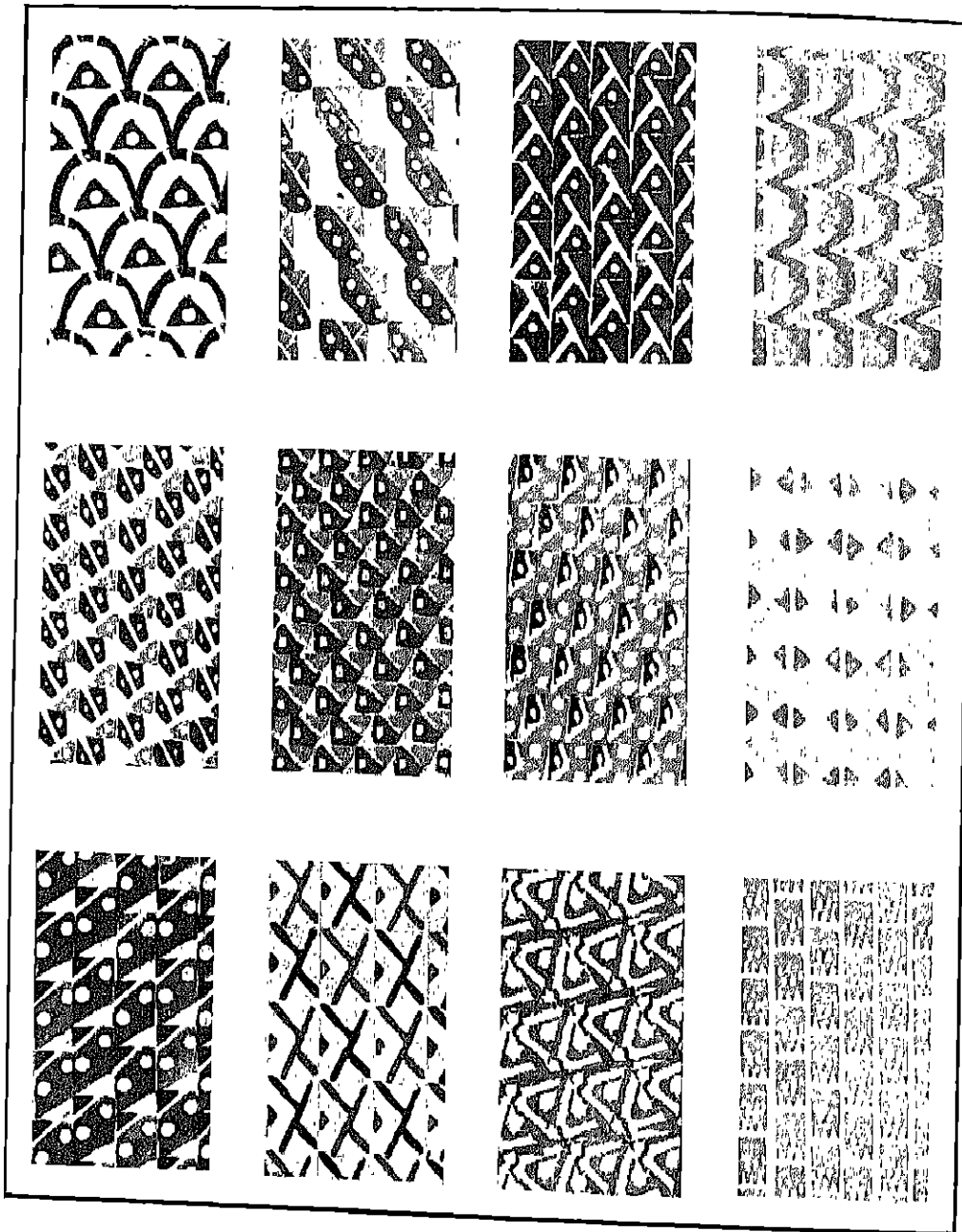
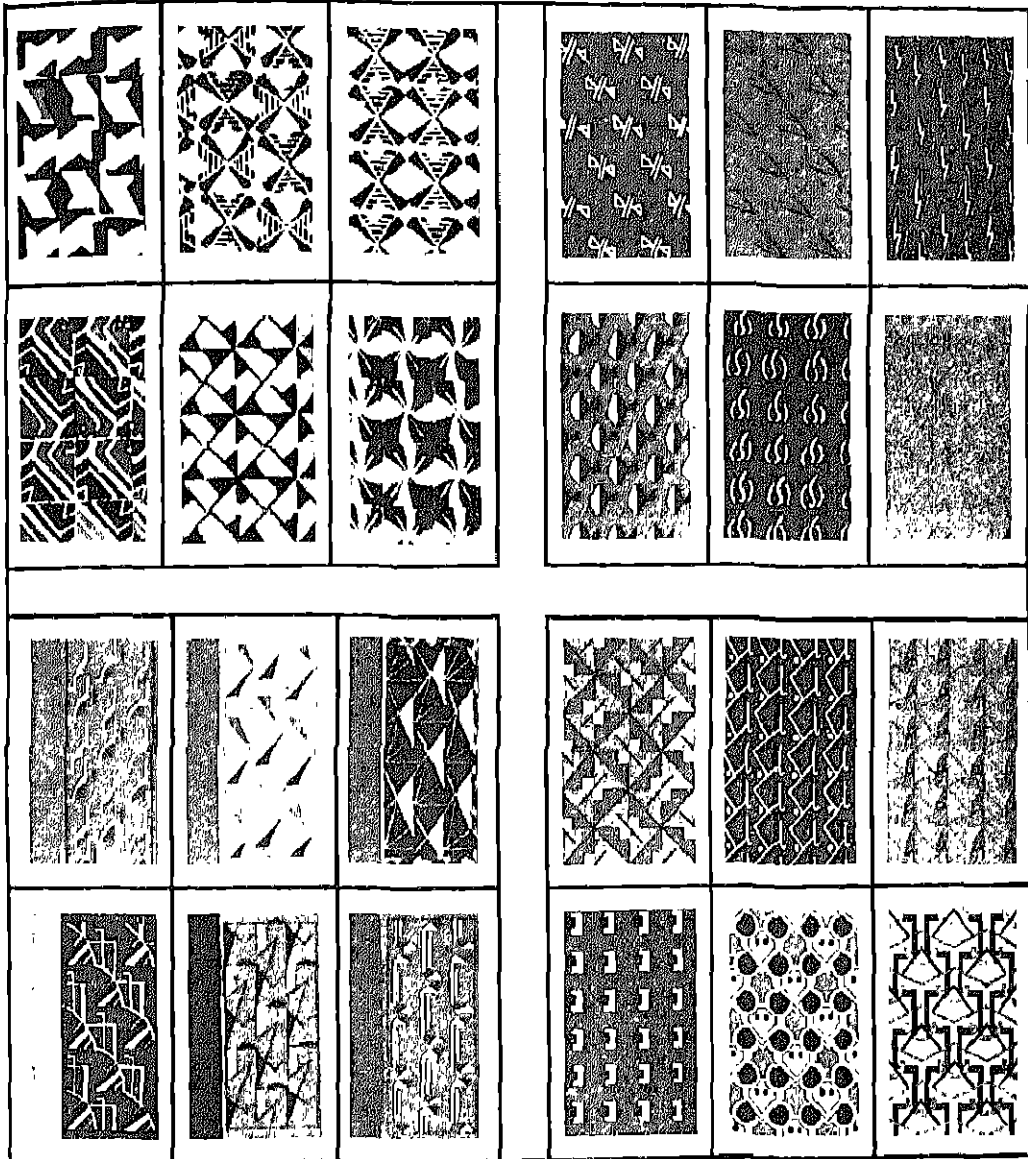


FIG. 12,
POTATO CUTS
(Class Picture No. 122 in the Portfolio.)

PLATE XI



COVER AND WRAPPER DESIGNS
(Class Picture No. 123 in the Portfolio.)

13. LINO BLOCKS
15. COVER DESIGN

14. FREE BRUSH WORK
16. WRAPPER DESIGN

PLATE XII

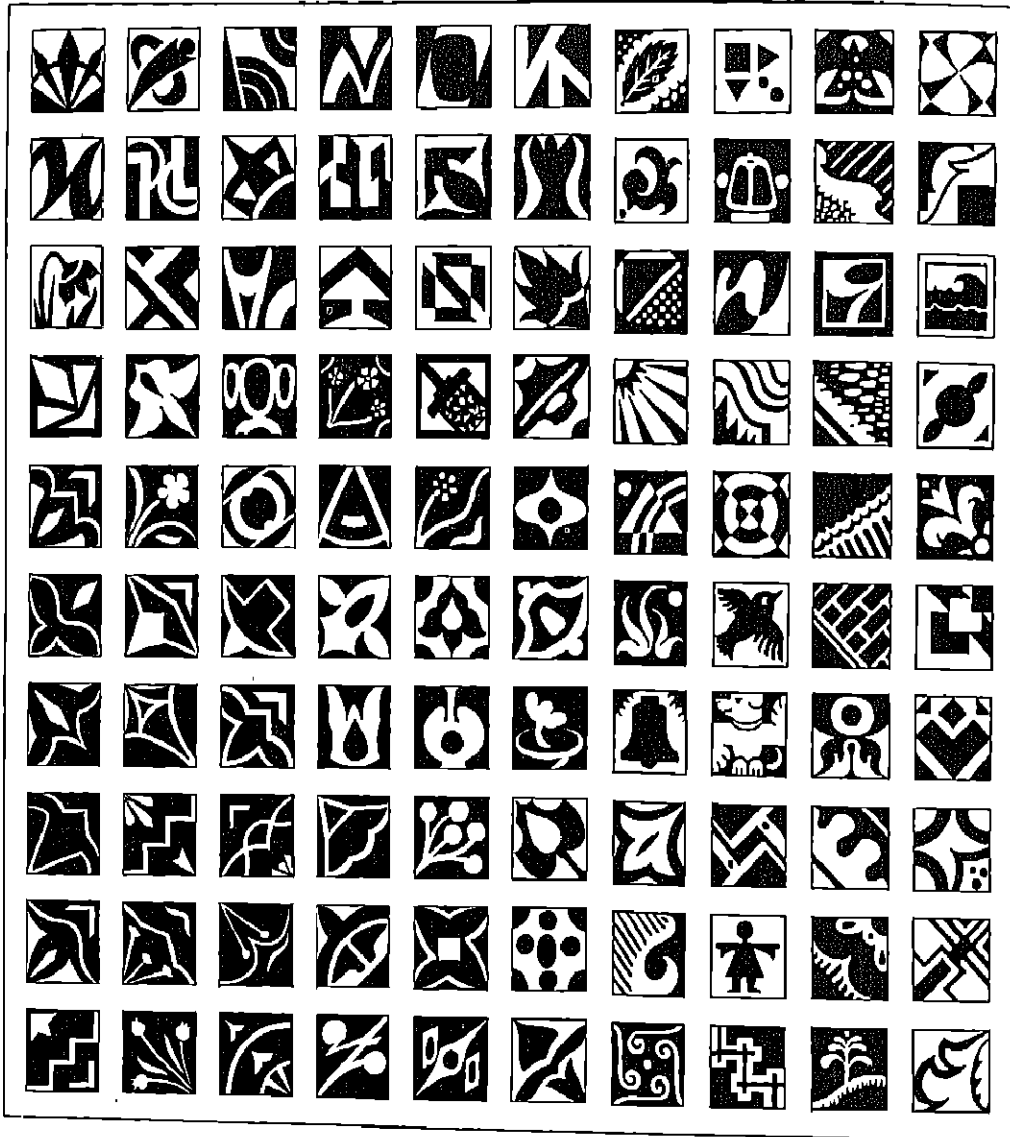


FIG. 17
 SUGGESTIONS FOR LINO CUTS
 (Class Picture No. 124 In the Portfolio.)

PLATE XIII

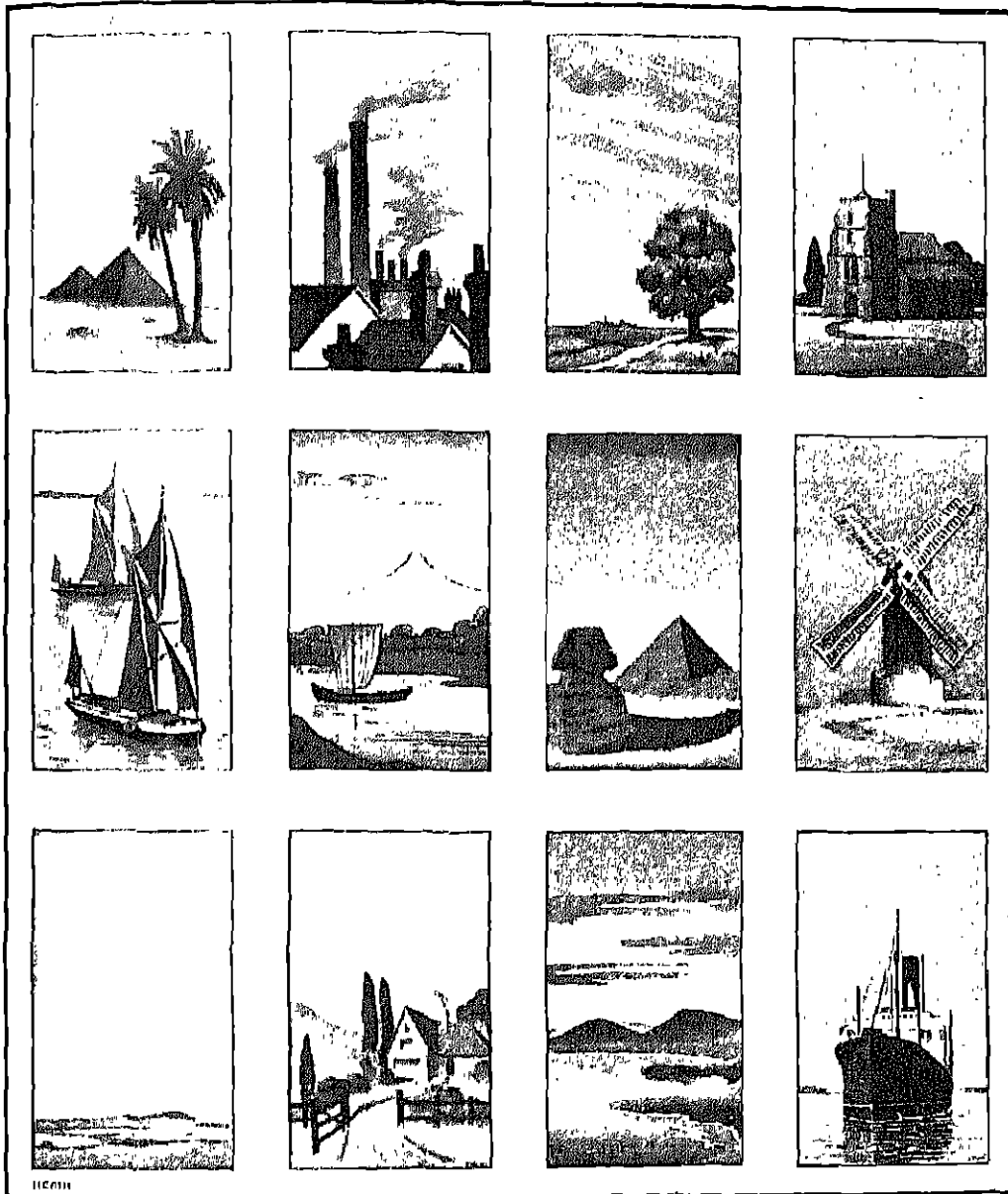


FIG. 18

PICTORIAL WORK IN WATER COLOUR
(Class Picture No. 125 in the Portfolio.)

PLATE XIV

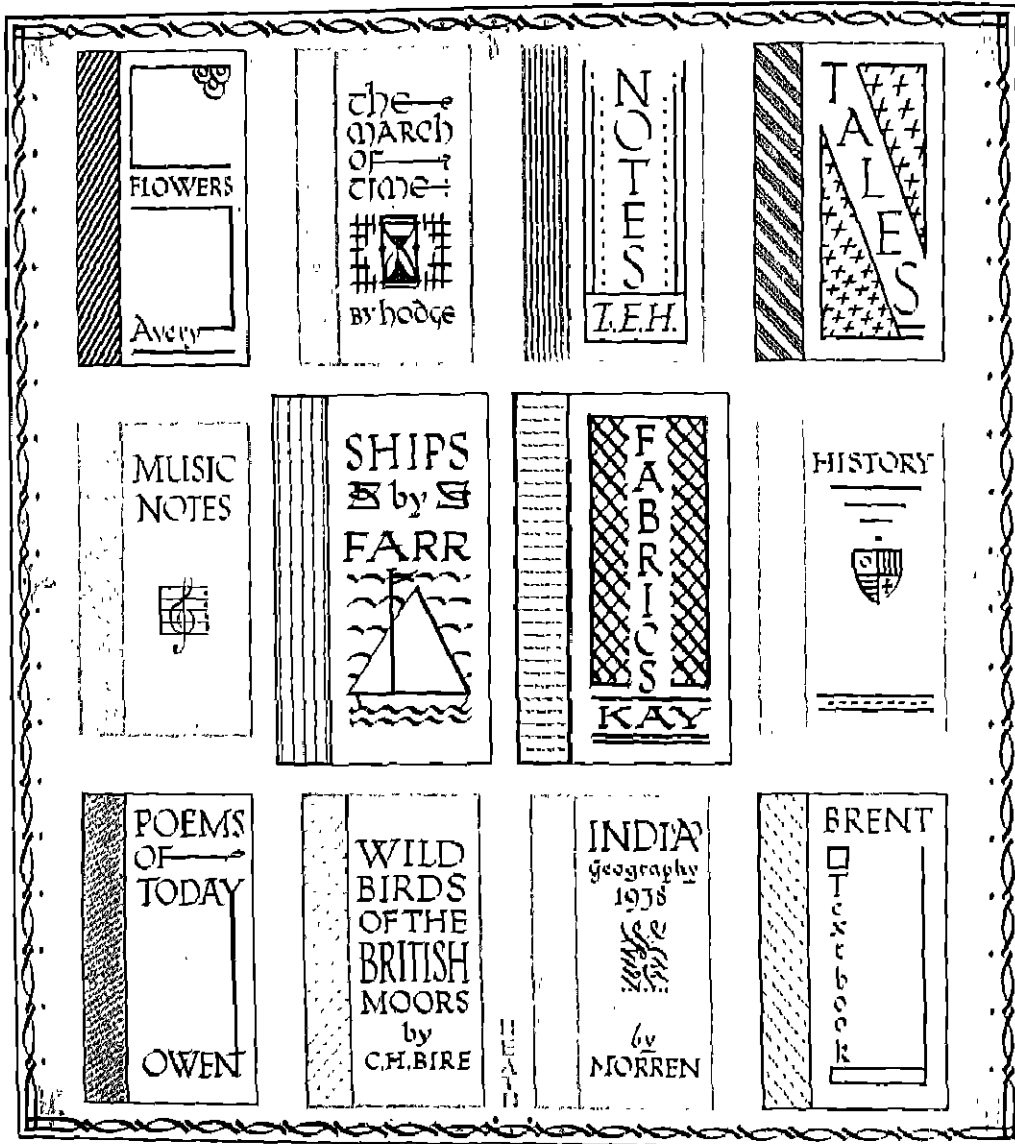


FIG. 19

TITLING

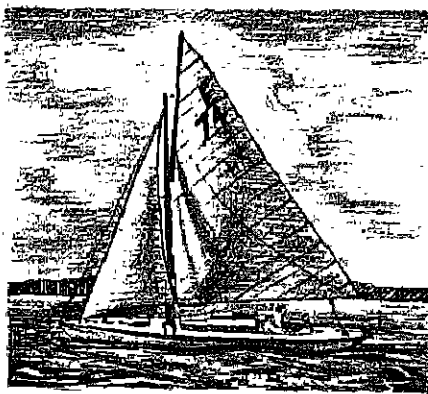
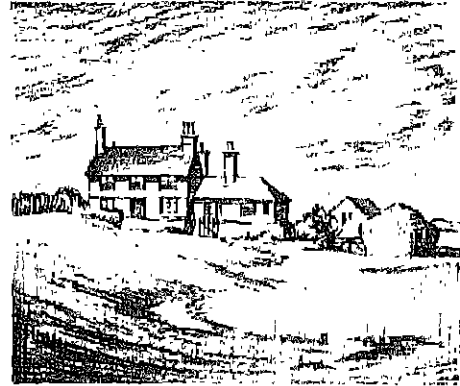
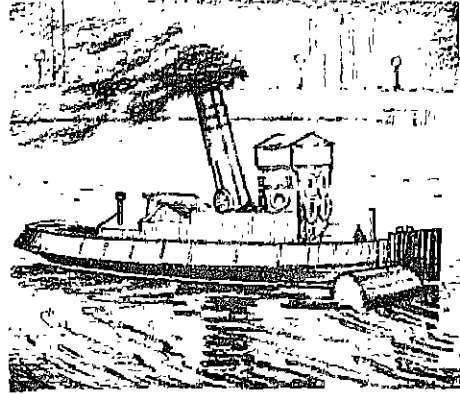
(Class Picture No 126 in the Portfolio.)

PLATE XV



FIG. 20
PEN AND INK SKETCHES

PLATE XVI



L.E. HEATH

FIG. 21
PASTEL WORK

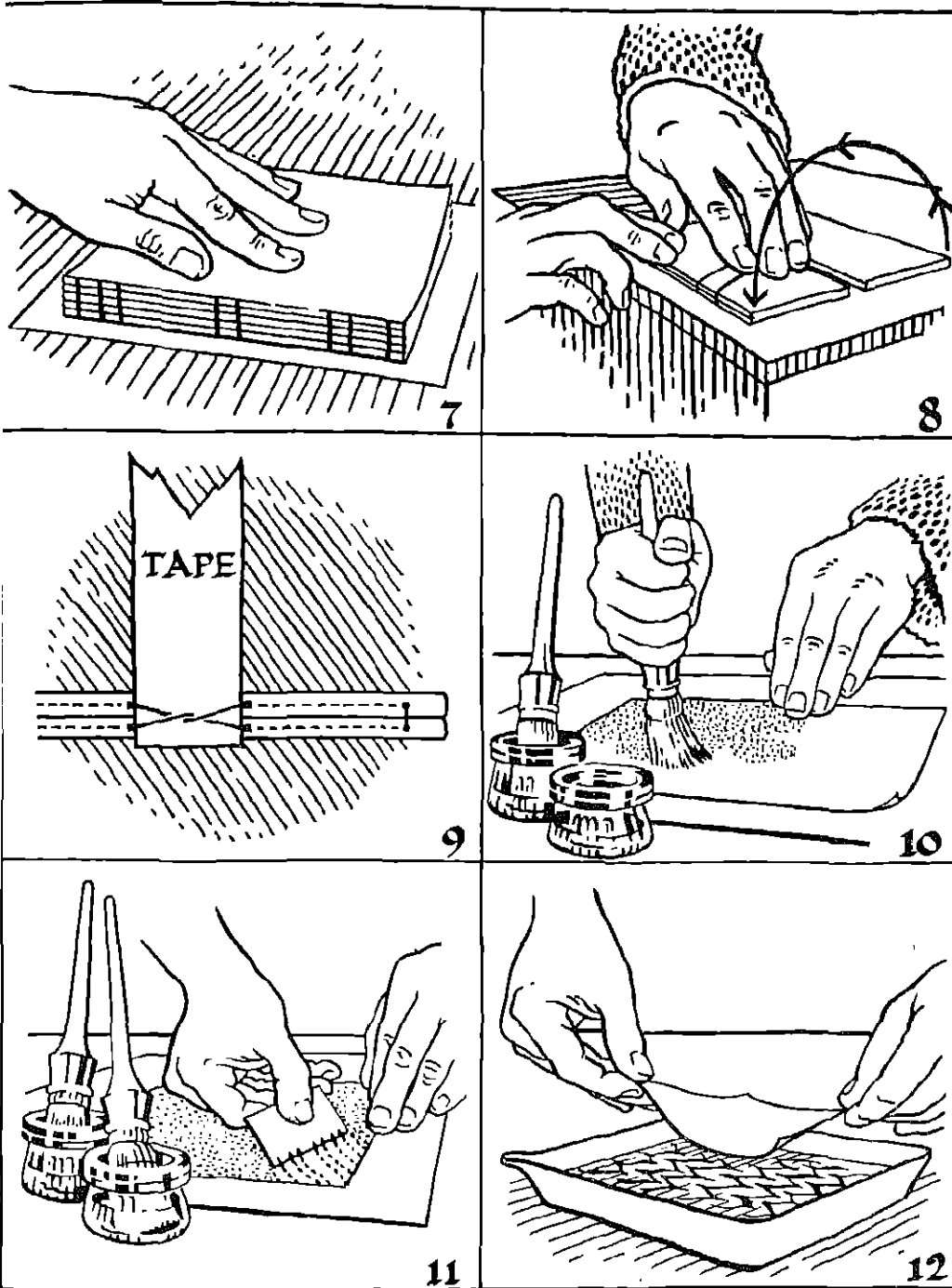
PLATE XVII



FIG. 22
THE FARMER



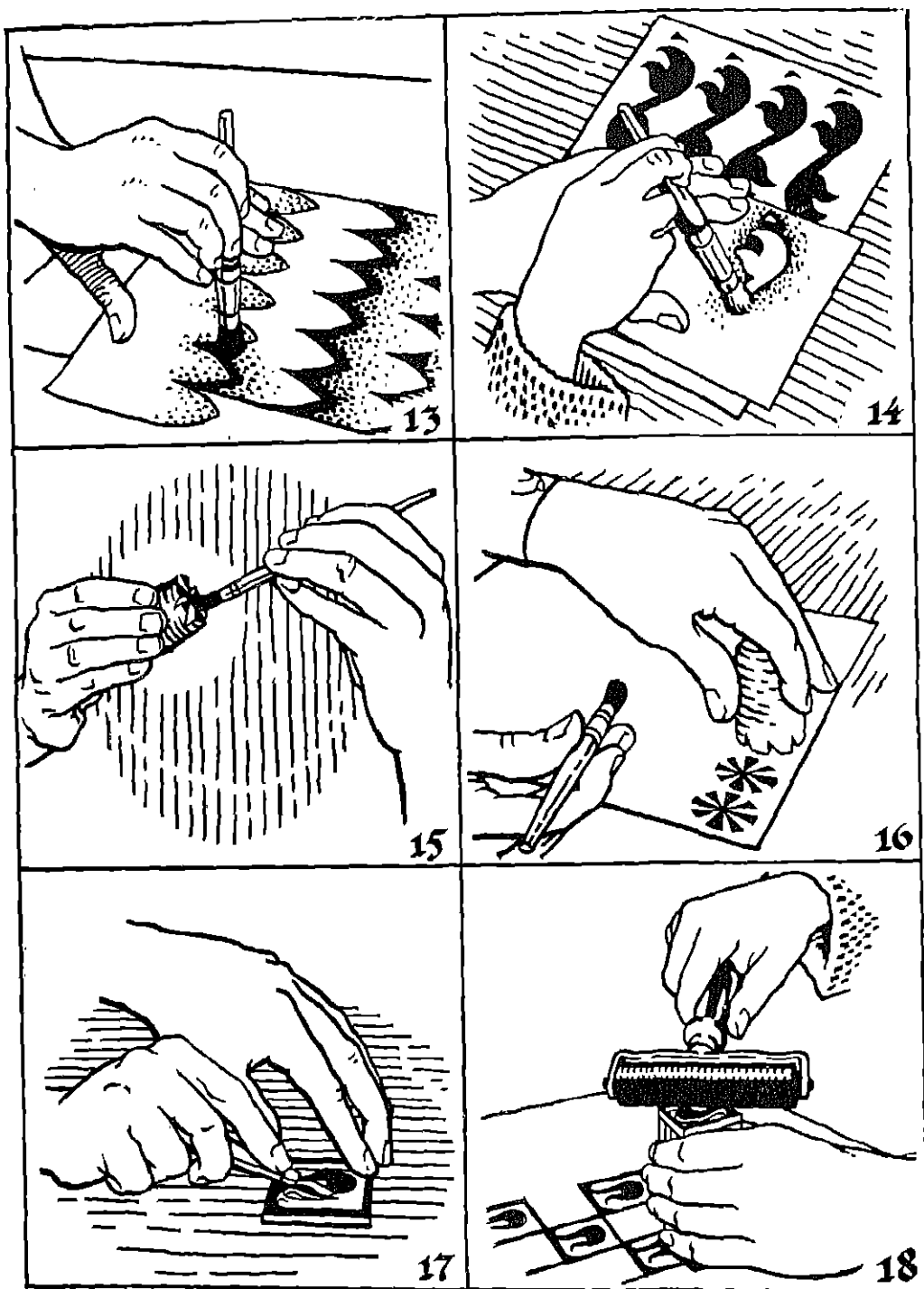
FIG. 23
THE BEGGARMAN



7. BOOK READY FOR SEWING—FIRST STEP
 9. PASS EACH THREAD OF ONE SECTION UNDER
 THREAD OF PREVIOUS SECTION
 11. ENDPAPERS—USING COMB OF STRAWBOARD

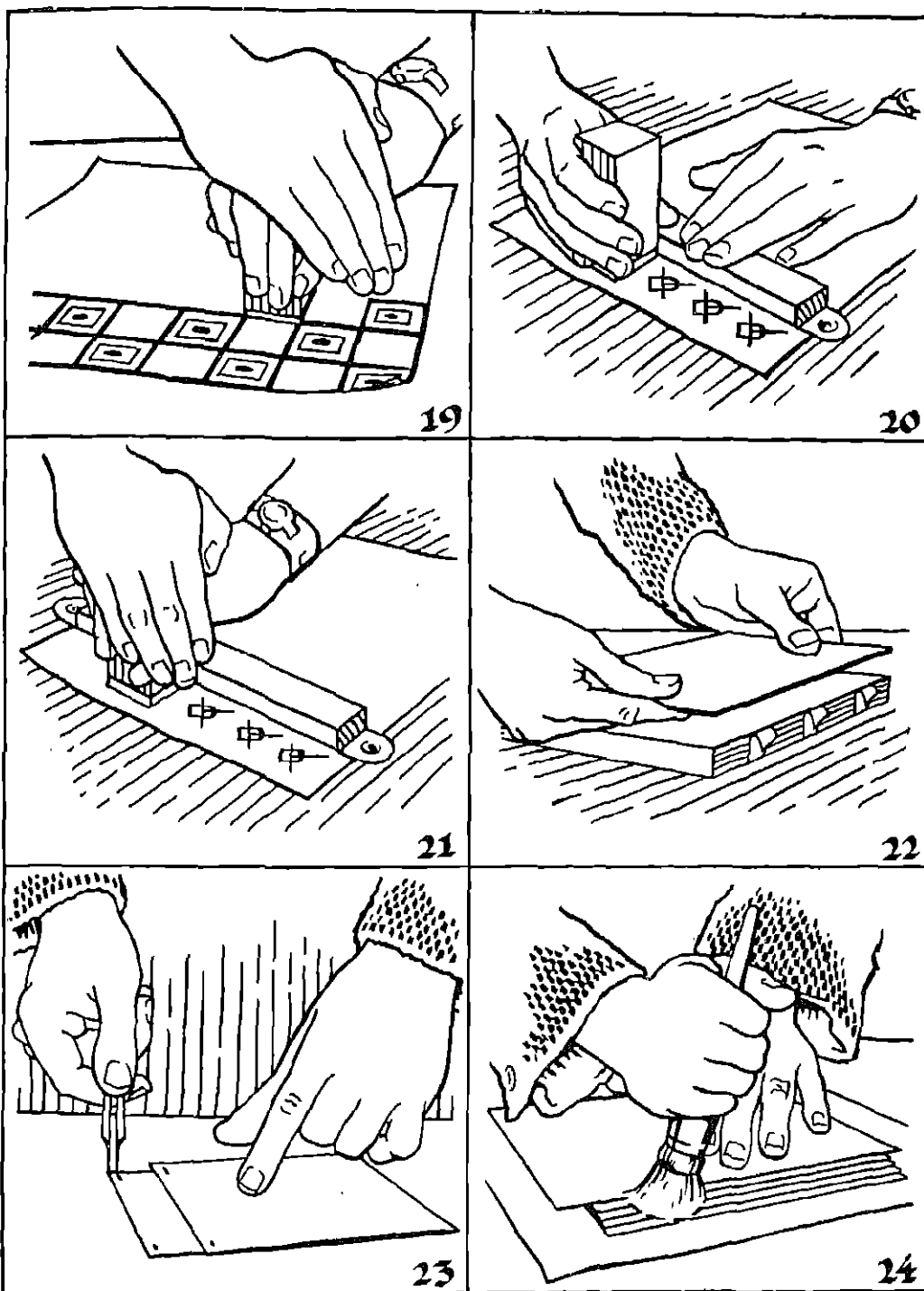
8. SEWING FIRST TWO SECTIONS
 10. ENDPAPERS—STIPPLING COLOURS
 12. ENDPAPERS—OIL BATH METHOD

PLATE XX



13. WORKING AN EDGE STENCIL
15. APPLYING COLOUR TO CUT POTATO
17. CUTTING AN UNMOUNTED LINO BLOCK

14. WORKING AN INTERIOR STENCIL
16. APPLYING POTATO CUT TO PAPER
18. INKING-MOUNTED LINO BLOCK



19. IMPRESSING INKED LINO BLOCK
 21. PUTTING PRESSURE ON A LINO BLOCK
 23. MARKING WHITES OF ZIGZAG

20. USING A STRAIGHTEDGE IN APPLYING A LINO
 BLOCK
 22. TIPPED FANCY PAPER BEING PUT ON THE BOOK
 24. TIPPING ENDPAPERS

glue into the pores of the paper. Do not merely brush it over the surface. Go over the "treads" a number of times, working down the "stairs" not across.

Each fancy paper is fixed to a white paper as shown in Plate XXII, Fig. 25. The glued surfaces are rubbed over with a bone folder, lightly nipped in the press and put aside to set before being folded.

A word of warning is necessary here. Children will use far too much glue and their efforts to glue these steps do not make in many cases a neat job. In the hands of the expert, or even the more observant children, glue is the best adhesive as it dries quickly and allows the work to be continued with little delay. If it is found desirable, a thick flour paste might be used instead of the glue. It does not dry so quickly, which is an advantage for inexperienced hands. With paper, glue is inclined to be a little stiff. Whether glue or paste is used, it is well to give the glued papers a light nip in the lying press or the letter press.

Folding is necessary to form the zig-zag, which gives the type its name. For this, take a white paper and a fancy paper which have been stuck together. Place them on the table with the fancy piece on the left. Place an iron straightedge on the fancy and up to the marks on the white—on one side these correspond with the folded edge of the fancy. Run a bone folder along the straightedge so as to break a joint in the white (Plate XXII, Fig. 26). Flick the white up and rub its underside along the straightedge once more; remove the straightedge and fold the white down on to the fancy. Turn the whole over so that the surface formerly on the table is now uppermost. Once more, working in like manner to the marks on the white, turn the second white down on to the fancy. An end view should show a large W with a folded fancy stuck on a short arm. This short arm with the adhering fancy will be away from the book when sewn on; in other words, it will be towards the boards; the other arm, to which nothing is attached,

lies towards the heart of the book. This description may seem somewhat long, but if the steps are worked out methodically, they soon become mechanical.

Endpapers of this type are never sawn through as are sections. Later on, not even sections will be so harshly treated. Sawing is best reserved for cord-sewn books.

The folded endpapers are now placed in position, on a level with the head of the book, and marks are made on them with a pencil opposite the saw kerfs or cuts on the sections. Through these pencil marks the needle and thread will travel. The sewing is done, not through the fancy paper, but through the white, which is nearer the heart of the book. To strengthen this part, an extra folded white paper may be put in here between C and D (Plate XXII, Fig. 26).

Finish with two or three kettle stitches one below the other.

The edges are cut in the fourth lesson.

BOOK CRAFTS- IV

Neatening the edges.—The book has been sewn, its endpapers made and attached.

In this lesson, the edges are to be neatened. They must be treated so that instead of being uneven, the leaves will be uniform in size. The leaves of the fore-edge will coincide, as will those of the head and tail—if there are any leaves which project or recess, the work has been badly done. When completed, the book will be more easily opened at a particular page; it will look tidier; it will be more easily dusted.

A certain amount must be cut off each page, but cut off only as little as possible to achieve your purpose.

Begin with the fore-edge. Hop the book on its head (Plate XXII, Fig. 27), and afterwards on its back (Plate XXII, Fig. 28). Note that in order to do this the hands do not change position, but the book swings between the gripping fingers and thumbs.

All the section backs are now in the same plane.

Stand the book on its tail. Looking along the head, note the shortest section, calculating from back to foredge. This section determines the amount to be cut off the foredge of all sections. Open the book at this shortest section. On the page place a strip of paper running from back to foredge. On the strip mark with a pencil a distance just short of the width of the page. On the outside plain white of either end paper mark this same distance on the foredge, near the head and also near the tail (Plate XXII, Fig. 29). The cutting of the foredge will be done first through these two joints, then continued in a plane parallel with the back of the book. For the actual cutting operation a method of holding the book quite firmly must be found. This is done by tightening the book between the jaws of the lying press, and there cutting it by means of the plough. If an attempt were made to place the book alone in the press, it would be found almost impossible to keep it in shape. Very probably the book would be twisted because its back, when in the press, would not be horizontal. If it is cut like this it would, when hopped on its back after removal from the press, assume a very undesirable shape and probably be injured beyond recovery. To avoid this end, a sandwich (Plate XXII, Fig. 30) is made in the following way. Two boards, a little longer than the book, about 3 in. deep and $\frac{1}{2}$ in. thick are prepared. These are called cutting boards. The book is placed between them, and all three are lowered into the press.

Once more hop the book on its head and then on its back.

One board, called the front board, has its straight edge placed just up to the two marks made on the outside sheet of the endpaper; the other board, the back board, is placed on the opposite side of the book extending slightly above it, and has between it and the book a loose piece of strawboard. The plough knife will meet

this strawboard before it is called on to touch the harder board, and thus the knife edge will be spared. Tightly gripping the sandwich with one or two hands, the whole is lowered into the press and held with one hand while the other is used to turn the screws so that the press jaws barely grip the book and prevent it from falling. Both hands are then used on the sandwich (Plate XXIII, Fig. 31). The sandwich must go down as a whole; no one part must move without the rest. The first joints of the fingers of both hands lie against the back face of the back board and help to tighten this board forward; the second joints of the fingers are on the top edge of the board and with the aid of the thumbs on the top of the front board, push the sandwich down until the top edge of the front board is in the same plane as the top of the front cheek of the press. Run the fingers along the press to test it (Plate XXIII, Fig. 32). Tighten the press, using the press pin.

The plough knife starts on a level with the top of the front cheek of the press, and if the front board of the sandwich should project beyond this level, the knife must either cut off the projection or ride on it before reaching the book; nor must the board be below the front cheek. If the cutting is continued the result will be wrong in both cases. Most ploughs wobble because of worn or ill-made guide rods. By holding the guide rod and the end of the screw and pressing forward, this wobbling, which may cause torn edges, can be prevented. The plough knife is brought up to the book gradually and fed into the book (Plate XXIII, Fig. 33). When the last page, the outer one of an endpaper, has been cut, cease ploughing. Too often the cardboard is cut into as well.

The screws are loosened a little and the sandwich is very carefully taken out upwards—not downwards. The foredge may be cut either as the knife goes away from or returns towards the binder. Working from the newly cut foredge two lines are

drawn with a try-square, one at the head and one at the tail, at right angles to the fore-edge, and on opposite sides of the book (Plate XXIII, Fig. 34). The head and tail are cut, usually, towards the binder, up to about the half-way mark; and then away from the binder for the inner half. When cutting the head and tail, the book is so placed in the press that the back of the book is near the binder (Plate XXIII, Fig. 35).

No mention has been made of gluing the back before cutting the edges. It is best with children at this stage to cut all three edges without gluing. For the next stage, rounding and backing, a glued back is necessary, but children cannot cut the edges quickly enough to keep the glue in a fit and pliable state.

Each of the cut edges should appear as a perfect rectangle.

BOOK CRAFTS—V

Rounding and backing.—So far, the book has been sewn, its endpapers made and attached, and all three edges cut.

In this lesson we deal with two very important operations known as *rounding and backing*. They are worked in that order. Before either step is attempted, the book is lightly but sufficiently glued (Plate XXIII, Fig. 36). Remember it is the glue which lies only in a very small area at the back of and between the sections which serves any useful purpose. Glue piled up on the back is a nuisance, shows a want of understanding and enquiry, and stiffens the back so much that it is difficult to open the book.

Consider the sections to be two fingers (Plate XXIV, Fig. 37). An excess of glue at the second point will be felt when the finger is opened after the glue has set (see Plate XXIV, Fig. 38).

A light book, such as the one with which we have been dealing, may be glued while being held in the hand. Do not allow any

glue to get into the back of the zigzag endpaper, or the purpose of this type of endpaper is defeated. To illustrate this last point to the class open the book at the endpapers and bend the book boards well back, or, at least, the papers which would be attached to the boards. The "give" of the zigzag will be seen. There is no such freedom with other types, and the too-common torn endpapers result.

With a suitably sized glue brush apply a little thin, warm glue all over. With the fingers rub the glue well in between the sections and allow it some time to get tacky before further working. Too many people object to having glue on their fingers. It is not possible to engage in bookbinding without getting a certain amount on the fingers. It is easily removed. This terror must be altogether ignored or the class will get the idea that there is something objectionable about it. The gluing cannot be dispensed with and will not injure the most highly polished nails.

If the book is of the encyclopaedia type it is not easily glued by holding it in the hand. A newspaper is placed on the table overhanging the edge. The book is left on this with its back up the table edge, and gluing is done as before (Plate XXIII, Fig. 36).

The glue will now be ready for the next step of the work.

With a book of few sections, rounding is not so necessary. With the heavier type of book proceed as shown in Plate XXIV, Figs. 39 and 40. The action of the fingers is to pull, and of the thumb to push, while the board or hammer gently taps the sections downwards and towards the binder. Both sides are treated alike, and the result will be the gouged-out effect on the fore-edge. It is necessary to round a book because the folds of the sections, the thread used in sewing and possibly the paper used in guarding, together make the back of the book thicker than the fore-edge. This extra swelling has been divided out somewhat by the rounding in a regular and pleasing

way. Were the back left to itself, it would be as likely to go concave as convex, or be a combination of both.

Backing.—This operation is equally, or perhaps more important, but it is more difficult to do well. The book is held on its side in the hand, with the side of the book on the palm of the hand. A backing board, a little longer than the book, is placed on the endpaper and almost level with the book back. A space, not more than the thickness of the board to be used for making the case or cover, is left between the board and back. Without disturbing this first board, the book is turned over and the other backing board applied similarly to the other side of the book (Plate XXIV, Fig. 41). The book with its two boards is then lowered into and almost level with the top of the lying press, and there it is tightened. Standing at either end of the book, the hammer is used to give a down and out blow to the book back on either side of the middle (Plate XXIV, Figs. 42; Plate XXV, Fig. 43). Beginners usually make the blow straight down instead of down and out. The result will be seen when the book is opened. The backs of the sections will be squashed instead of being bent over. Do this for yourself. Hold your hand up, with fingers extended and palms at right angles to your face. You see a thumb, first and second fingers. Slowly close the fingers. Now tighten them in against the palm.

This is how a book is backed. The sections are bent over and then beaten down. No sledge hammer blows are necessary. Just as the fingers might have been squashed down and made clubbed, so can the book sections be deformed.

While backing is in progress, the modelling of the back must be supervised. The two sides of the book showing on the tops of the backing boards should be symmetrical. Remove it from the press and apply a piece of mull, extending from kettle stitch to kettle stitch, for $1\frac{1}{2}$ in. on either side.

It may be necessary (1) to round, (2) to back, (3) to pack, before cutting the head and tail as shown in Plate XXV, Figs. 44 and 45.

BOOK CRAFTS—VI

Colouring the edges.—The book has now been sewn; the endpapers made and sewn or tipped on; the edges cut; it has been rounded and cut and mull has been stuck on the book back. The mull extends from kettle stitch to kettle stitch and to each side of the back for $1\frac{1}{2}$ in. to 2 in., the warp—the stronger threads—running parallel with the length of the tapes for greater strength.

Slogan—"Mull selvedge at head and/or tail." Try to tear each set of threads and work out the reason for the above rule.

The edges are now to be further treated. White paper soils easily. Finger marks, etc., do not show up so readily on colours, therefore it would be well for the edges of the book to be coloured. Ordinary water colours mixed with water or thin glair may be used. Glair is necessary for gold tooling or titling the book, but this is dealt with more fully later on. Water dye is perhaps better than water colour. It is not easily rubbed off. It need not be strongly mixed. A few coats of thin wash give a more even result than one application of strong colour.

To do the foredge, the book is tightened in the press between two boards, and the colour is applied with a sponge or pad of cotton wool wrapped in cotton cloth, as used for French polishing. The only precaution necessary is to start at the middle of the foredge and work towards the tail and head as indicated in Plate XXV, Fig. 46. If an attempt were made to apply the colour in one sweep, some colour would run down at the beginning end of the foredge. The head and tail, in turn, are tightened up in the press and in each case colour is applied, working from the back toward the foredge.

This is called whole colouring or solid colouring of the edges, and is preferred

by many to the next method, called *sprinkling*.

Sprinkling.—This consists in causing a number of small spots of colour to fly on to the edges. Two methods are shown in Plate XXV, Figs. 47 and 48. An iron-bound brush called a sprinkling brush specially made for the process, or even the zinc-bound glue brush, is lightly charged with colour and smartly struck against the press pin, which is held perpendicularly before the edge to be sprinkled (Plate XXV, Fig. 47). Spots of colour fly to the edge and with a little practice even distribution of spots is possible. Practise on a sheet of newspaper before attempting a book.

Another method of sprinkling is that done with a small brush, similar to a stumpy, hard, bristle shaving brush, called a finger brush. The strong bristles are pulled away from the book edge with a piece of stick (Plate XXV, Fig. 48). As they fly back into position they project some colour on to the book edge. In sprinkling, the book is kept closed by a board placed on top.

The edges, as they are now, are rough enough to retain a good deal of the dust that may fall on them, while it should be possible for this dust to be cleaned away with a rub of a cloth. This is possible only when the edge is smooth. The best finish of all is gilding, but this comes later on in the course. A very good and serviceable surface can be obtained with beeswax. A piece of cloth is rubbed on to a slab of beeswax, carrying away with it a small quantity of wax, which in turn is transferred by rubbing to the book edges. Hard rubbing with the cloth spreads the wax and makes a smooth surface.

Making the case.—Case binding is the commonest type of binding. It is cheap and lasts a long time with fair treatment. Two pieces of cardboard a little larger than the book are attached to glued cloth,—this is the case. The end papers, tapes, and mull, are glued and placed in position in the case. The whole forms what is known as case binding.

There are machines which can turn out completed cases at the rate of thousands per hour. This is one factor towards the cheapness of school books and other case-bound publications.

Strawboard, as used in school, will be what is known as $\frac{1}{2}$ lb., 1 lb., or 2 lb. For a thicker board any of these may be glued together.

The book is placed on a sheet of 1 lb. board (Plate XXVI, Fig. 49), with the board up the shoulder made in backing. At each end of each edge a mark is made about $\frac{1}{2}$ in. from the book. On the back of the inside face of the board put a mark (say X) and a similar mark opposite on the book, to show how the board fits the book. The other side is treated likewise and marked with, say, O. Lines are drawn through these marks and the boards cut with a pair of shears (Plate XXVI, Fig. 50), or knife and straightedge (Plate XXVI, Fig. 51), or a cutting machine.

BOOK CRAFTS—VII

Completing the case.—Cloth as used in school is about a yard wide and cut from rolls 30 to 40 yards long. It can be had in a variety of surfaces and colours. A matte surface is perhaps the easiest to work; the plain shiny surfaces often give disappointing results in the hands of a beginner. When ordering cloth it is well to get a variety; for example, 20 two-yard pieces of assorted colours and surfaces, rather than 40 yards of one piece.

Woven cloth consists of two sets of threads—the warp running along the length, and the weft running across the width. The warp is the stronger set of threads, and the cloth must be cut so that this warp runs round the back of the book from one board to another, rather than from head to tail. It will be obvious that the strain which will separate the boards from the back will be that which extends from the head to the tail. This must be met and opposed by the stronger set of threads, with the selvedge to the head and tail.

Now look at Plate XXVI, Fig. 52. Note the position of the roll and from this determine the warp. Place the book and boards as shown; swing on the back as shown in Plate XXVI, Fig. 53 and drop it into the position shown in Plate XXVI, Fig. 54. Make a shears' cut $\frac{3}{4}$ in. beyond the edge of the boards. As illustrated in Plate XXVII, Fig. 55, crease the cloth right across its width beginning from the nip made in Plate XXVI, Fig. 54. Make the edges coincide and the crease will be at right angles to the edges. As in Plate XXVII, Fig. 56, push the shears along the crease made in Plate XXVII, Fig. 55. Do not clip your way along this line. Notice how a draper cuts cloth. The pushing gives a more regular edge than the chopping action. The piece of cloth as now cut off is the correct width for wrapping round the book. Leaving $\frac{3}{4}$ in. at the head and tail for the turn-in, the cloth is nipped, creased and cut. You now have a piece of cloth which will be a perfect fit and with enough to spare for a $\frac{3}{4}$ in. turn-in all round.

The cloth has to be glued, and it is now necessary to be bold. The left hand holds the cloth firmly. Grasp the glue brush as you would a dagger and use it in a somewhat similar fashion. The action of the brush is a combination of stabbing and painting. Drive the glue into the pores of the cloth, working from the centre outwards, over and off the edges, as indicated in Plate XXVII, Fig. 57. Nearby will be the book with its boards in their final position, with reference to the book; the stiffener (a piece of fairly stiff paper, the length of the boards and the width of the back of the book); shears and bone folder. The book is lifted without displacing the boards, and placed on the glued cloth $\frac{3}{4}$ in. from the edge. The left hand keeps the top board in position. The stiffener is placed on the cloth next to the back as shown in Plate XXVII, Fig. 58—the wet cloth must not stick to the book back. The remainder of the cloth is lifted up and over to the left, to be held up temporarily by the thumb and forefinger of the left hand (Plate

XXVII, Fig. 59). The cloth is made taut without being stretched and, fitting well against the back, is rubbed into contact with the top board, the left hand little finger and its neighbour keeping the board in position until the cloth is attached. The boards and cloth are opened back as in Plate XXVII, Fig. 60, and the book is removed. If the stiffener is out of place and is not lying evenly between the two boards, lift it and place it properly. The whole may be turned over and a bone folder used lightly to bring the glued cloth everywhere into contact with the boards and stiffener.

The corners of the cloth are now mitred, —cut off at 45° . Keep the cut away from the corner of the board for a distance of at least the thickness of the board (Plate XXVIII, Fig. 61). An alternative method of mitring the corners is shown in Plate XXVIII, Fig. 62, where the two glued surfaces are pinched together and cut as indicated. Another method of making a strong corner as in library binding, is shown in Plate XXVIII, Figs. 63 and 64.

The cloth is rubbed against the foreedges (Plate XXVIII, Fig. 65), and turned in with a pulling-in action. A little of the cloth from the foreedge will overhang the cloth at the head and tail. With a bone folder this overlap is pressed into contact with the cloth beneath, as in Plate XXVIII, Fig. 66. Next stand the book on its head or tail, and, with the fingers of both hands, beginning from the back, rub along the top edges of the boards. This does away with the possibility of "pencil pockets" on the edges (Plate XXX, Fig. 67). Once more the bone folder rubs the cloth against the inside of the board and stiffener. Turning the case upside down, the bone folder is run all over the surface. The case is now made. While the glue is still soft, a design, made up mainly of straight lines, may be worked on one or both boards or back, with a bluntly pointed bone folder and straight-edge as in Plate XXX, Fig. 68.

This is known as *blind tooling*.

BOOK CRAFTS—VIII

Making a half-bound case and closing down.—You have been making whole bound cases. It is to be hoped that you have made several such cases, as a good deal of practice is required. You are now going to attempt another type of binding—half binding (Plate XXIX). If you look at the case when finished according to directions, it will be seen that the joining strip (Plate XXIX, Section B) and the corner pieces (Plate XXIX, Section E) added together make about half the area of the case—hence the term half binding. The boards and the stiffener will be marked out and cut as already directed.

A peculiar mistake is made by nearly all beginners—the stiffener is made so that the length and breadth correspond with the length and breadth of the back. The stiffener is to be made the length of the *boards* and the width of the *back of the book*. Plate XXIX, Section A shows that it is the length of the boards. If shorter, there will be unstiffened parts at the head and tail which will soon look unsightly and will readily break down.

The piece of cloth or leather called the joining strip will next be cut. How far this piece is to extend on to the boards is a matter of taste and judgment,—as an experiment try one-third of the width of the board and then one-fourth. Something between the two will probably be decided on as best.

The pieces of cloth or leather to cover the corners are next to be made. These, as shown in Plate XXIX, Section C, are at first squares. Again, the size is a matter of personal taste. As a rough guide, try a 3 in. square for a book of about 7 in. by 5½ in. A 4 in. square would certainly be too big for this sized book. Even ½ in. makes a big difference. Try the experiments with paper and spare strawboard. Having obtained the squares, cut them diagonally with a knife and straightedge, not shears, as shown in Plate XXIX,

Section D. Superimposing these four triangles, equal pieces are cut from each, again using a knife and straightedge. The cut will be parallel to the base and run through a point about one-third down the perpendicular height.

Look at Plate XXIX, Section F. The left-hand board, looking down at the sketch, has the corners showing as they would be seen from the inside of the case. One of the corners has been glued and placed on the corner of the board as shown in the bottom left-hand corner. It must be kept beyond the corner a distance not less than the thickness of the board being used. The areas showing beyond the boards must be equal, and outside edges of corner piece parallel to edges of board. It is then turned in and should be as shown in the top left-hand corner. All four corners are treated alike. It is easier to put the corners on before the boards are joined. To avoid mistakes, it is well to put the boards in position on the book and mark the corners to be covered with a "X." Then hide this "X" with the pieces as shown in Plate XXIX, Section F.

The perpendicular height of the corners which shows when glued on and turned in (taking the base to be the longest line of the pieces of Plate XXIX, Section E), should equal the width of the part of the joining piece actually on the board.

Lastly come the inlay pieces. Each of these, to begin with, is a rectangle with about ¾ in. for a turn in on three sides. In really good work these do not overlap the joining pieces or corners. They are cut so that they just abut on these edges. Place the rectangle up to the edge of the joining piece as shown. Turn back each corner in turn so that one edge is parallel to the edge coinciding with the edge of the joining piece, and another edge abuts on the base of the corner triangle; see shaded portion of top right-handed board (Plate XXIX, Section F). Rub down the folds leaving a mark. With a knife and straightedge cut off the unwanted corner. Glue the remaining

part of the rectangle, place carefully in position, and turn in.

The half-bound case is complete. Set the "squares" of your book and take up the position shown in Plate XXX, Fig. 69 with the left thumb pressing down, and glue all over and off the edges. Then drop, as in Plate XXX, Fig. 70. Place pressing tins in endpapers, blanket boards outside, and nip in the press.

BOOK CRAFTS—IX

Split boards.—There is a type of binding known as split boards. It is important to know of this type but it is not advisable to attempt it before the third year of the school scheme. Where a binding is required which will stand any amount of wear, such as in library or account books, there is no better choice of binding than split boards. At first, it is similar to case binding, but in its later stages it is somewhat more difficult and complicated.

The sewing is done on tapes, the number varying according to the size of the book. The cutting, backing, edge colouring, mull attaching, are all done as before, but from now on the work is different. Look at Plate XXX, Fig. 72. The outside of the "waste" sheet of your zigzag endpaper is turned back on its back for a third or thereabouts. This third is glued for its whole length under the tapes and the tapes rubbed into contact. The top of the tapes and the vis-à-vis of the fold are next glued and rubbed down (Plate XXX, Fig. 72). It is a good plan to nip them between pressing tins. The other side of the book is treated similarly.

About one-third of the waste sheet projects beyond the back. Tear it off as shown in Plate XXXI, Fig. 73. Tearing leaves a finer edge than would be obtained by cutting. Next, shape it at the ends as shown in Plate XXXI, Fig. 74. The remainder can be called the flap or tongue.

A stiffener must now be made. It is

quite different from the kind which has been made before, but it serves a similar purpose. There are at least two methods of making this stiffener, the simplest method being as follows. Look at Plate XXXI, Fig. 75. A fairly stout, though not hard paper such as that often used for packing school stationery, etc., a type of strong "sugar" or "rope" paper is procured. The book back for its full length and width is glued and the paper is placed and well rubbed into contact as shown in Plate XXXI, Fig. 75. The paper must be longer than the boards will be, and more than twice the width of the book. Let this set. When it is securely fastened, it is turned as shown in Plate XXXI, Fig. 76 and rubbed down with a bone folder along its hinge. The excess of the paper beyond the width of the back is folded back and removed by tearing or cutting. Part of this top loose flap will form the stiffener. Leave it while the boards are being prepared.

Each board of the book is made up of two boards. At first, make each pair separately. Later, you will see how both pairs may be made at once. Procure a piece of 1 lb. strawboard, and a piece of 8 oz. strawboard, somewhat larger than the book, as was the piece which has been used up to now to make the case. Glue these all over except for a space of $1\frac{1}{2}$ in. to 2 in. wide from the edge which will come up against the book back. Nip in the press between pressing boards. Make a similar combination for the opposite side. The thinner board of the pair will be next to the book.

In turn, slip the flaps into the mouth left in each board and mark a $\frac{3}{8}$ in. square. Cut through the marks. Plate XXXI, Fig. 77 shows the cut boards with the flaps in position. Having glued the outside of the flap (Plate XXXI, Fig. 78); the inside (Plate XXXII, Fig. 79); the mouth of the boards (Plate XXXII, Fig. 80); each flap is inserted as shown in Plate XXXII, Fig. 81. The squares are set (Plate XXXII, Fig. 82), leaving a space of about $\frac{1}{8}$ in. between the back edge of the board and

the shoulder, shown as A in Plate XXXII, Fig. 83. This space is known as a French joint, and into it the cloth or leather can be pushed. A blanket board is placed each side, and tins inside (Plate XXXII, Fig. 82), and all is nipped and left to set.

The stiffener must be the length of the boards. With the shears resting against the boards cut off the excess length (Plate XXXII, Fig. 84). Split the stiffener at each end for about $\frac{1}{4}$ in. (Plate XXXIII, Fig. 85). The outer strip is the stiffener. Cut from the inner half the part extending beyond the head and tail (Plate XXXIII, Fig. 86).

The covering is made as has been already done. There is one precaution—the cloth must come round as shown in Plate XXXIII, Fig. 87. The stiffener will then be tightly closed against the back (Plate XXXIII, Fig. 88). To reverse the path of the glued cloth might end in disappointment or disaster. Keep the turn-in not more than $\frac{1}{2}$ in. to $\frac{3}{4}$ in., or there will be a difficulty in chasing it down inside the stiffener. With the thumbs, push the top back edge of the boards away from you (Plate XXXIII, Fig. 89). Slip the turn-in between the stiffener and the back (Plate XXXIII, Fig. 90). Run with a bone folder against the crook of the forefinger (Plate XXXIV, Fig. 91). Rub the cloth or leather along into the French joint (Plate XXXIV, Fig. 92).

Close down as in a case binding.

BOOK CRAFTS—X

Sewing.—Up to now the sewing has been done with no emphasis on style. If you have been a member of a class whose members do plenty of work at home, someone will have run short of thread and used the home supply of cotton thread. As a rule, this happens only once, for when the operations of rounding and backing, more especially the latter come to be done, the thread does not hold—it breaks, and you will be com-

pelled to go right back to the beginning. Use, then, as good a thread as can be obtained—bookbinder's linen thread 25-28 or 16-28 is the best for almost all purposes. Strength, sufficient for the work in hand is the main consideration though finish is not to be ignored. This thread is usually sold in $\frac{1}{2}$ oz. skeins which are plaited for use. It may also be had in 1 lb. bobbins.

How can good or bad sewing be recognised?

Bad sewing can be recognised in the following ways. The book may be sewn too tightly or too loosely. When it is sewn too loosely the sections move freely and the diagonals of the back can be easily bent. If it is sewn too tightly, the back of the book assumes a *concave* shape and the fore-edge wants to fan itself open. This is a worse fault than the loose sewing. The best style is, of course, somewhere between these two extremes. A well-sewn book feels solid when taken in the hand. Finished, it is almost board-like. The sewing must be loose enough to allow the sections to move sufficiently far in the processes of rounding and backing; but not so loose that they move too far either towards the fore-edge or back, or irregularly at the head or tail. Sewing which is too tight is usually caused when the kettle stitch is being made—the thread is drawn too tightly before going through the loop. It is sufficient if care is taken to see that there are no kinks in the thread. There is sufficient tension if the thread runs through the fingers when jerked fairly gently. Always finish off with three kettle stitches, one under the other, and not all three between one pair of sections. This would cause a lump. All joinings in the thread are to be made so as to come within the book. If a knot should come outside on the back it must be driven into the book in order to be hidden. This is not good for the book.

Your books, up to now, have had comparatively few sections. Think what would happen if the book had fifty to sixty sections, as many of the volumes sold in fortnightly

parts have, and if it was sewn with a thread in each section. There would be a considerable swelling of the back. This can be reduced to about half by sewing on two sections with one thread—a style known as "two on." You have been sewing up to now in the style known as "all along."

In sewing *two on*, the first two sections and also the last two are sewn all along. This makes a more solid start and finish. The path of the sections 3 and 4 through the sections is shown on Plate XXXIV, Fig. 93.

Paper sizes.—

Crown: 20 by 15. $\frac{1}{2}$ C: 15 by 10. C $\frac{1}{4}$ to: 10 by $7\frac{1}{2}$. C $\frac{1}{8}$ vo: $7\frac{1}{2}$ by 5.

Demy: $22\frac{1}{2}$ by $17\frac{1}{2}$. $\frac{1}{2}$ D: $17\frac{1}{2}$ by $11\frac{1}{4}$. D $\frac{1}{4}$ to: $11\frac{1}{4}$ by $8\frac{3}{4}$. D $\frac{1}{8}$ vo: $8\frac{3}{4}$ by $5\frac{7}{8}$.

Royal: 25 by 20. $\frac{1}{2}$ R: 20 by $12\frac{1}{2}$. R $\frac{1}{4}$ to: $12\frac{1}{2}$ by 10. R $\frac{1}{8}$ vo: 10 by $6\frac{1}{4}$.

Imperial: 30 by 22. $\frac{1}{2}$ I: 22 by 15. I $\frac{1}{4}$ to: 15 by 11. I $\frac{1}{8}$ vo: 11 by $7\frac{1}{2}$.

There are other sizes, but these are sufficient for our purpose. Learn Crown, 20 by 15; add $2\frac{1}{2}$ to each dimension—Demy; again add $2\frac{1}{2}$ —Royal; Imperial, 30 by 22. Repeat this until it is known. A full sheet folded once is called *folio* and is written 20; when it is folded a second time it is known as *quarto* (4to.); and folded yet another time, *octavo* (8vo.) (See Plate XXX, Fig. 71).

BOOK CRAFTS—XI

Variety in binding.—When recently looking over some books which had been bound by school children one fact was very noticeable. The work on the whole was good—in some cases excellent—but it was all monotonous. All the books were quarter bound. It seemed as if that school possessed at most two colours in cloth. I knew for a fact that there were several varieties, perhaps more than twenty. I can also understand how it came about that only two had been used. The lady

responsible was conscientious about waste and to minimise this as far as possible, she took out but two cloths at a time. She had visions of wholesale destruction of fabrics if more were on view—and perhaps she was right. The children, too, accepted the situation. It never occurred to anyone that a choice was desirable, even essential. How was this difficulty to be overcome? After a discussion the following points emerged.

1. Children must have guidance in their choice of colours. In this particular case the lady was the art mistress as well, and discussions about colours were of almost daily occurrence.

2. A number of books combining cloth of various colours, mostly in harmony, but some approaching the opposite extreme, could be made up and kept for reference. This could be prepared in time but would be difficult to store, not easily viewed for comparing one with another, and would most likely suffer in the hands of the children.

Eventually, the following scheme was arrived at, and it appears to meet the necessity. Ten sheets of white cardboard were ruled. One inch from each side, a line was drawn with a lettering nib (reservoir), using black Indian ink. Nine rectangles were spaced within this, each $5\frac{1}{2}$ in by $3\frac{1}{2}$ in. (postcard size). These rectangles were separated by black lines. Each rectangle represents one board of a book, and on them we are about to stick our various combinations of cloth. Let us first work out a quarter-binding size. Authorities differ as to what proportion the narrow rectangle of cloth (the portion going round the back of the book and joined to the two boards) should bear to the width of the board. Some say a third, others a quarter. I prefer the latter, but as I have already said, it is a matter of personal taste. In this case, let the width be a quarter of the width of the board.

One quarter of $3\frac{1}{2}$ in. is $\frac{7}{8}$ in., leaving $2\frac{4}{8}$ in. for the width of the larger rectangle. Cut these with a photographic trimmer for speed

and accuracy. Do not glue, gum or paste these rectangles. Use the method of dry mounting. This is fully described in the following extract from the B.J.P.A.

Dry mounting.—"In this process a sheet of specially prepared dry mounting tissue is placed between the photograph (cloth, in this case) and the mount and pressed together in a heated press or by a hot hand iron. It is emphatically the best mounting method because it not only avoids stretch or distortion of a print (the cloth, in this case) but also provides a waterproof protective skin between the print (cloth) and the mount."

Tissue is obtainable in all sizes from photographic shops; 12 in. by 10 in. costs about one penny per sheet.

The first operation consists in partially attaching a piece of tissue to the cloths by touching it locally with a heated metal—try a table spoon quickly taken from boiling water and dried. Next, carefully placing the two rectangles of cloth with the tissue in the rectangle, apply a heated domestic iron at the junction of the two for a moment to cause them to adhere to the mount. Then, on top, place a piece of plain transparent paper and draw the iron slowly across the paper with a firm pressing action.

A number of these sheets carefully prepared, framed and hung in the craft room will give the child something to turn to and select his colours from. It is safe to predict that a new interest will be awakened and better and more artistic work will be done.

In your next requisition, include 20 by 2 yds. of cloth rather than 2 by 20 yards. Obtain a book of specimens.

BOOK CRAFTS—XII

Titling, cover designs, lettering.—After twenty-eight years of teaching, I am convinced that much of the advice given to me as a young teacher was unwise. "Encourage children to be original." "Leave the child to his own resources." "Let him find his own way out." All these axioms are

foolish excepting, perhaps, the first. It is much the same thing as if we said to each generation, "You cannot start from where your predecessors left off. We are wiping out all they knew and you must start right from the beginning and accumulate your own store of knowledge. What we know of all the sciences we intend to keep to ourselves." Are we not saying much the same thing when we tell children to "run off and make a nice design for your book cover," or, "Take two cloths to make a pleasing combination for your case." All teachers will agree that children must have some guidance and suggestion before they can make a start.

Consider the titling of a book. At one time it was thought sufficient if we put the title on with brass type using foil of different colours. This calls for more physical strength than most children have, and should not, except in rare cases, be attempted in the school. All children can, however, print.

It is a good thing to show the children some work and invite their comments. If they can see the teacher's work, they have a foundation and a model from which they can work their own ideas. It is all to the good if they criticise and attempt to improve on the suggestions given them.

Suggested cover designs for books dealing with lamps, wires, trams, night, owls, birds, webs, wishes, may also be illustrated.

The lettering may run diagonally, but if you wish you may try circular, semi-circular, vertical, horizontal, elliptical styles, etc. All the letters are the same height, but this may be changed as you please. Incorporate something on the cover which illustrates the contents.

This same principle—giving children a start—must be kept in mind in considering a design for a book case. Again, on a $\frac{1}{2}$ Imperial sheet of paper draw nine rectangles, postcard size, to represent book fronts and within these draw a number of designs in (1) straight lines, (2) curved lines, (3) combinations of (1) and (2). Look at them: accept or reject them, and they have served

their purpose. Frame and hang something on the same lines in the book-craft room. Something more elaborate and advanced is shown on Plate XI, Fig. 14. Here, an all-over design, painted on with tempera colours, can be done by a surprising number of children. But again it is necessary to help them, and these charts are the means of doing so.

The line designs will be drawn, first with a pencil lightly, and then with lettering pens with a reservoir (William Mitchell's Rex type), using a thicker straightedge than the ordinary school ruler for the sake of the thicker bevel. The pen lining will be done with Indian ink,—black ink on bright cloth looks very well. There may be occasions when other colours serve the purpose better.

Once more it must be emphasised—and frequently repeated in the classroom—we are attempting to have a fine piece of work done in a fine way. We are not concerned with books as such, but with fine work, finely done.

Given the right teacher, craftwork may become one of the most gripping, absorbing and worth-while subjects in the school curriculum. Anyone who has actually taught all the processes included under the title BOOK CRAFTS will know that this statement is no exaggeration.

The finished book should be protected from dust and dirt, and in order to do this it should be wrapped in paper, which has had a design painted on it as suggested in Plate XI, Fig. 16.

BOOK CRAFTS XIII

The flexible binding.—When a book is bound in flexible binding it is sewn on cords, usually five pairs, in such a fashion that the cords, instead of sinking into the backs of the sections, ride on the back of the book. This is achieved by omitting to put saw kerfs or cuts under the cords, and by passing the thread completely round

each cord (Plate XXXIV, Fig. 94). You will notice that the space between the tail cords and the tail is greater than that between any other pair. The four above the tail are all of equal height; the head panel is less than the tail panel, but about a square longer than the other four.

If a book with all its cords equally spaced were put on a shelf, the head and tail spaces would appear less than the others. To avoid this and also in order to give a more pleasing appearance and feeling of strength, the bottom panel is made the greatest (Plate XXXV, Fig. 95). When setting out to mark the book back in this manner, it is well to bear in mind the problem in which £1 is to be divided among six people, one person having two shillings more than each of the others. You give him his two shillings and find how much is due to each of the others. From this last discovered amount you deduct a little and give this to No. 6 in addition to the amount paid to Nos. 2, 3, 4, and 5.

The procedure is much the same for marking out the book back. Leave a bit off at the tail and divide the remainder into six equal portions using spring dividers. Slightly close the dividers and mark the 2nd, 3rd, 4th, and 5th panels—No. 6 will take what is left, which will be an excess over 2, 3, 4, and 5 equal to four times the amount by which the dividers were lessened. Mark the five dividing lines with a soft pencil rubbed backwards and forwards across the book back. Next, put in the saw cuts at the head and tail for the kettle stitches. During these processes the book will have been locked in the lying press between two boards slightly below the book back (Plate XXXV, Fig. 96). The sewing is much slower than any hitherto done, and it requires a great deal of care. There must be no tightening by pulling of a thread at the end of a section. The thread must be pulled taut between each first insertion in the section and the first cord to be rounded, and between each pair of contiguous cords.

BOOK CRAFTS—XIV

The sewing must not be too tight. Experience will show what the tension should be. Plate XXXV, Figs. 97, 98, 99, 100 and Plate XXXVI, Figs. 101, 102, show how the frame is set up. The bands of Plate XXXVI, Fig. 102 are moved to correspond with the marks on the book and the cross bar, then raised by means of the screw blocks, thus drawing the bands taut. The space between the lines of thread showing on the back should be equal to the space between the centre lines of two sections just in contact—in other words, each line of thread must not be pressed too tightly down on its predecessor. Should this be done the book will not round well.

The endpapers will be of the zigzag pattern.

When the sewing is done the book is glued up, rounded and backed. The boards, made of millboard and not strawboard, are next prepared and attached. Next, the edges of the book are cut. This is known as *cutting in boards*. The leather is then prepared and put on. When backing, the ordinary backing hammer is not suitable owing to the small space between the bands, as the bands should not be flattened more than is absolutely necessary. It is best not to hit them at all, for if they are hit they are no longer raised bands, and a crushed-in appearance to the hinges of the sections will result.

Glue the back carefully—fully, but not excessively. Rub the glue down between the sections with the finger tips, and when tacky use the sharp edge of a backing or joiner's hammer. When the backing is completed and while the glue is still pliable, pull all bands into position at right angles across the book back with band nippers (Plate XXXVI, Fig. 103). Make the bands of uniform thickness.

The millboards may be prepared now. As mentioned above, the boards are attached to the book before the edges are cut. You will probably be surprised to see the beautiful edge which results from this method of cutting.

Preparing millboards.—The method of preparing the millboards is entirely different from anything hitherto attempted. The thickness, according to the size of the book, etc., having been decided upon, two pieces of millboard are put together into the lying press and have one long edge cut. Still keeping the two pieces together, and using a try-square, another line is drawn at one end at right angles to the new line and both again cut.

It is now necessary to decide on the length and breadth of the boards. The length should be equal to the length of a page, and the breadth equal to the length from the shoulder to the foreedge of the book. Later, when cutting in boards, cut from the book a square at the head, tail and foreedge. The positions of these two other lines (determining the breadth, and length), having been decided upon, and the boards cut accordingly, the boards should be perfect rectangles. This may be tested by trying the boards in positions different from those occupied when they were cut. If put on a book as they are now, the leather in drying would cause them to go concave on the outside and so prevent the book from closing properly—there would always be a gap. This is avoided by making the boards concave on the inside first. From this position they are pulled flat by the drying leather. This concavity of the inside is brought about by lining the boards. A piece of white paper, known to the trade as "White Cap or News" and used by grocers, in fish and chip shops, etc., is cut to a size a little larger than a board. It is well pasted with flour paste, and to ensure perfect contact, one long edge is placed exactly up to a long edge of the board and carefully rubbed down and nipped between the blanket boards in the press.

Another piece of paper, roughly twice as large as the first, is similarly pasted, started from the same position as the first, brought along over the first, is nipped,

rubbed along what will be the foredge and over the other side—later the outside—as far as the back edge. The whole is once more nipped in the press to make sure that there are no air pockets. The boards—both are treated alike—are not left in the press except for perhaps half a minute. They are allowed to dry, standing like an inverted V (Plate XXXVI, Fig. 104). The doubly coated side should be on the outside. The boards left until dry will be slightly concave on the outside (Plate XXXVI, Fig. 105). This drawing is slightly exaggerated in order to make it quite clear. A little triangle, sides about $\frac{1}{2}$ in., is cut off the back edge of each board at the head and tail at the corners marked C and D in Plate XXXVI, Fig. 106. Due to a slanting cut, the triangle shows larger on the inside than the outside of the board. The slips—the frayed-out ends of the bands—are to be laced through holes in the millboards.

Each board in turn is placed in the position it will finally occupy and five pencil marks are made on it opposite the five pencil marks in the middle of each pair of cords. Using a try-square, these marks are extended for a short distance across the board. About half an inch from and parallel to the back edge of the board, a line (A) is drawn intersecting the five previously drawn lines. At each intersection a hole is made from the outside, using a bodkin. These holes are the points of entry of the slips. The slips have gone in from the front. Through five other holes they are brought to the front.

On the back of each board another line (B) $\frac{1}{2}$ in. from and parallel to the first line of holes is drawn. In this another line of five holes is made with the bodkin—from the back. Each is dropped perhaps $\frac{1}{2}$ in. nearer the tail than its neighbouring first hole. Through these second holes the slips will be pushed to the front.

You will notice that the slips between the back edge and each first hole make unsightly lumps on the board, if laced in. This lump can be accommodated, and thus hidden in a V-shaped groove in the board

(Plate XXXVII, Fig. 107). Its dimensions will depend on the thickness of the slips. As the slips taper towards their ends, so also will the groove be wider and deeper on the back edge (Plate XXXVII, Fig. 108). The ends of the slips, for easy threading, are twisted with a little paste. Between each first and second neighbouring hole on the back a trench may be dug. Put the slips through and rivet on the knocking-down iron. Leave the ends for the present.

BOOK CRAFTS—XV

Cutting in boards.—The method up to now has been to cut the foredge first. Here the order will be, (1) head; (2) tail; (3) foredge.

Take the book in the left hand as if to read it. The slips leave the boards free to move, as they have not yet been fastened in the V-shaped grooves at the back. Lower the front board a square—such a space that when this board is later returned to its final position, the amount of board projecting at the head will be the generally accepted correct amount. The cutting will be done on a level with the top of this dropped board. To avoid cutting the back board, insert a piece of waste strawboard between this board and the book.

Once more see that the front board is dropped the correct amount; place a cutting board each side as usual; carefully drop into the lying press for cutting. In cutting, remember the shoulders you have made in backing. If you begin to cut from the back, you will almost certainly break a lump off the shoulder. The shoulder has not much support if it is rudely pushed forward. The plough knife should be as keen as possible. Start cutting from the foredge towards the back. The back of the book is always towards you in cutting the head and tail. Lift the plough back "idle." Continue like this until the half-way mark is reached. From here, the knife may be made to cut backwards and forwards.

Stop when the piece of strawboard packing is reached. Do not attempt to cut the left-hand shoulder. This can be done with the shears after removal. Treat the tail in a similar fashion. Before tying up, along the foredge of the projecting endpaper draw a line, coinciding with the foredge of the millboard—it is an advantage, in this style, to leave the endpaper a little larger than the book. When cutting the foredge, the back must be made as flat as possible before the actual cutting. All the backing process is undone, but not destroyed. The back is made nearly as flat—fully as flat if possible—as it was when being marked up. Put the book, back upwards, between two boards in the lying press. If necessary, lightly paste the back. When the glue has softened remove all surface paste and glue with a damp cloth. Do not injure the paper in the process. The glue on the top side of the hinges serves no purpose. It is the glue just between the very ends of the sections which helps to keep the book together. Any excess of this prevents the book opening freely (Plate XXIV, Figs. 37 and 38). When the surplus glue has been removed, take the book from the press. Drop the boards as shown in Plate XXXVII, Fig. 109. Tie lightly round the book, with a running knot, a length of $\frac{1}{2}$ in. cotton tape. With the thumbs pressing into the back and the other fingers aiding, flatten the back evenly all along. Keeping it so, pull the tape tightly to keep the back flat (Plate XXXVII, Fig. 110). Examine the back, and if it is not flat even now, it can be made flat. With a cutting board on either side, the book is lowered into the press and ploughed. Inspect the back first at each end to make sure it is flat.

The foredge cut, the book is removed. The tying taken away, the book will return to the rounded back state once more. The foredge which was parallel to the back a moment ago will now assume the familiar curved shape and be still parallel to the back. Such a smooth surface, without steps, is unobtainable by any other method.

There are other methods of flattening the back—between the back edge of the dropped boards and the back of the book *trindles* better known to many as *button sticks* (Army & Navy Stores, 7 $\frac{1}{2}$ d.) are inserted and the whole hopped flat on the smooth side of the lying press and tied up towards the back with $\frac{1}{2}$ in. cotton tape. If no trindles are to be had, use a flat piece of iron or wood. Work slowly until the steps and pitfalls are familiar.

BOOK CRAFTS—XVI

Making a headband.—At the head and tail we are to build a headband. The building of this headband will be described step by step.

With the boards lowered level with the head, put the book in the press with the head of the foredge sloping towards you. Rub a little glue on a pliable piece of cord to keep its fibres from breaking asunder; dry the cord by passing it through the gas flame; rub between the fingers to smooth; cut off a piece longer than the length of the back. Tie together two pieces of hard silk, something like buttonhole twist. One end—the longer, if there should be a difference—is threaded through a needle and then knotted, so that the needle does not part company in the later operations.

1. Push the needle through the hinge of the first section and below the kettle stitch, and pull through until the knot reaches the hinge (Plate XXXVII, Fig. 111).

2. Bring the needle up from the back once more and push it through the same hole. A loop is formed at the head (Plate XXXVII, Fig. 112).

3. Through this loop, pass your prepared piece of string on which the headband is to be built (Plate XXXVII, Fig. 112).

4. Now let us decide to have three thicknesses of the needle thread (green) and four of the loose end (yellow) showing on the headband.

5. There is one strand of green already

on. The loose end we bring up and round the cord—two strands are now showing. Once more bring the thread over but not round and not through another hinge to the back; (up and over only), the needle—we are still working with the green—is pulled towards you and the length of thread between you and the back inserted in the leaves, the needle hanging down by the foredge.

6. The yellow thread is to the left of the green at the moment. Lift this yellow and bring it across to the right, over and at right angles to the green.

7. Wind it three times round the cord—this never goes through to the back, not having a needle, nor is it necessary that it should.

8. After this third round, the yellow thread is, as was the green, inserted in the book to the right of the green.

9. The green is brought across to the right over the yellow and twice round the cord, being tied down after the second, and then brought over, and then as directed at the end of paragraph 5 above.

10. The instructions as for paragraphs 6, 7 and 8 are repeated.

11. Near the end, the green is pushed through to the back and the yellow brought over the green and under the cord to the back and there knotted to the green.

12. The tail is treated in a similar fashion.

13. Head and tail complete, the headband threads showing at the back are glued and covered with a piece of paper, which, when dry, is cut off level with the top of the headbands. It might be better to tear the paper—this leaves a feather edge not noticeable through the leather later on. While the glue is still soft, any projections may be flattened by tapping with the bone folder. It is obvious that any treatment—colouring or gilding and burnishing—will be done before the headbands are attached. Of course, the colours in the headbands are to harmonise with those in the leather and endpapers.

BOOK CRAFTS—XVII

Gilding the edges.—There is a continual struggle on the part of the book lover to keep his books free from dust. These minute particles of dust must, above all, be kept outside the pages of the book. This is best accomplished when the edges have been made smooth by cutting and scraping, and have had put on them a coat of gold. This gold layer is so fine that a quarter of a million thicknesses of the material would be only 1 in. thick, yet it is so durable that it lasts practically for ever. Sometimes, only the head—on which most dust rests when the book is on a shelf—is gilded; the other edges are then coloured and perhaps burnished. In other cases, all three edges are gilded.

First of all the head must be prepared.

If the book is a flexible binding, as is most likely, the head will have been cut in boards. Lower both boards level with the head, place a thin board—say, $\frac{1}{4}$ in. canary wood—level with the head and top of the boards, and lower all into the finishing or lying press. Nip tightly. With a joiner's scraper, smooth the top surface of the book and boards—all are reduced together (Plate XXXVIII, Fig. 113). If only the book head were done, the amount of square which has been just right up to now, would be excessive when the boards were returned to their old position. After the scraper, a No. 0 glasspaper with a cork block may be used to finish the smoothing.

A cream is made of Armenian bole and glair and applied thinly to the prepared surface and polished with a stiff brush, in the same way that polish is applied to a blackleaded stove. The prepared bole has some blacklead mixed with the Armenian bole—a red substance when pure. This polished surface may be still more highly polished with a burnisher, lightly applied in long strokes from back to foredge without a stop (Plate XXXVIII, Fig. 114).

Gold leaf is $3\frac{1}{4}$ in. by $3\frac{1}{4}$ in. and is sold in books of 25 sheets. The gold may be had

in loose sheets or backed with tissue (transfer gold, as used by painters when gilding signs, leaded lights, etc.). A gold cushion is made by placing on a board, say 9 in. by 6 in., six sheets of blotting paper, to form a cushion and covering them with a piece of leather, flesh side uppermost, tacked all round the edge of the board. One corner may have two temporary walls about 5 in. high built to keep off draughts, by bending and pinning a piece of stout paper to the board.

Suppose the book head is about $5\frac{1}{2}$ in. by $\frac{3}{4}$ in. Cut up two strips of paper—cartridge paper will do—of about $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in. Open the first page of your book of gold. Gently slap the cushion just in front of the fore-edge. The front half of the leaf of gold will fall over to the left—assuming that you are right-handed. Put your gold knife, the ordinary kitchen knife will do, under the middle of the leaf and breathe lightly on the top. This will cause the leaf to open out flat. Carefully transfer the leaf to the cushion. The knife must be entirely free from grease. A little powdered bath brick will accomplish this. Even a trace of grease will cause the gold to adhere to the knife and be wasted either wholly or in part. The gold is cut into strips wider than the book,—something over 1 in. for a $\frac{3}{4}$ in. book. Each strip of the cut paper is rubbed on the forehead where it will pick up sufficient grease to hold the prepared strips of gold when gently rubbed on them. These two strips with their adhering gold are left near the book (Plate XXXVIII, Fig. 116). A mop—a bushy headed, soft-haired brush such as those used by painters or French polishers is charged with glair and drawn once along the book head (Plate XXXVIII, Fig. 115).

The glair for edge gilding is not at all as strong as for finishing. Its preparation is as follows. To the white of one egg add 10 oz. of cold water. Beat this until well mixed and a thick froth forms; allow to stand for about twelve hours; pour off the liquid. This is the glair for edge gilding. If you use finishing glair for edge gilding you will never obtain a good result.

Each paper, with its gold, is at once lowered into contact with the glair (Plate XXXVIII, Fig. 116). It will then be found that the gold leaves the paper and joins with the glair. Let there be an overlap where they are to meet. Any breaks must be repaired by breathing on top and transferring a strip of gold with the aid of a cotton wool pad.

Let the book rest until, when breathed on, the condensed breath dries off rapidly. The time will depend on the temperature of the room and will not be less than one hour—more probably two hours. A beeswaxed or blackleaded paper is lightly rubbed with a bloodstone on the edge. The bloodstone, with increasing pressure, is next used across and along to burnish the gold edge (Plate XXXVIII, Fig. 114). The other edges are treated likewise.

BOOK CRAFTS—XVIII

Preparing the leather covering.—What is the best leather to use? For pliability and hard wear morocco leather cannot be improved upon.

This leather is made from the hide of a Persian goat. For a smoother and softer leather calf is perhaps the best. Its wearing qualities are not, however, to be compared with those of morocco.

Make a paper pattern of the size you will require to cover your book, with about $\frac{3}{4}$ in. turn-in on each edge. It would be difficult to turn in leather or make it adhere to the boards, if it was not thin in the first place—or, at least, made thin by paring. Two types of knife are used, one, such as a cobbler uses, sometimes called a Barnsley knife, and the other, known as a French paring knife, is shown in Plate XXXVIII, Fig. 117. Some people advocate having the fore and middle fingers on top of the blade. I think it is best to have only the forefinger on top. The best advice, perhaps, that can be given is to experiment and find out what suits you personally. A slab

of marble or a lithographer's stone will also be required. Plate glass may be used, but it is too smooth and may be dangerous.

The edge of the leather is thinned until the dye shows through. The leather will be thinned from the turn-in—the book is placed on the leather and a pencil line drawn. The back will be thinned, down a distance equal to twice the turn-in, otherwise an ugly protuberance will show when the leather is on. At the beginning, keep acute the angle of the knife to the stone. With experience this may be increased until the best cutting angle is found (Plate XXXVIII, Fig. 118 and Plate XXXIX, Figs. 119 and 120). It is wise, of course, to practice on some scraps and go carefully. To see an experienced person do an edge in one sweep is likely to be misleading and make one underestimate the difficulty.

The prepared leather is next covered with flour paste and folded in two (Plate XXXIX, Fig. 121). The pasted faces should be together. Leave it to soak until limp, when the damp will show through. It may require pasting more than once.

Attaching the leather.—The back of the book is lightly pasted. Some paste is put in the V-shaped grooves made for the slips and the squares set. The book is placed on the leather and the leather drawn over on the other side. The edges are turned in after the corners have been mitred. For the present the turn-in at the corners may be allowed to overlap. The leather is worked up against the raised bands with the aid of the bone folder and band nippers (Plate XXXVI, Fig. 103). A cord is next run in front of the headband; in the little corner cut off the back of each board, down the side and in a similar path up the other side, to be knotted to the beginning (Plate XXXIX, Fig. 122). With a pointed folder some leather is brought from inside the back and bent over to form a cap for the headband. This is known as a *headcap*. The book, with a board of special shape (Plate XXXIX, Fig. 123) on each side,

is again tied up as in Plate XXXIX, Fig. 124, and left to dry for about a day. Very probably the leather in the corners overlaps (Plate XL, Fig. 125). Through the two leathers, run a slanting mitre cut (Plate XL, Fig. 126). Damp the leather slightly and remove pieces A and B and let the edges of C and D meet neatly (Plate XL, Fig. 127). The border on the inside of the two boards is next to be made equal all round. This is done by stepping each border piece twice with the spring dividers (Plate XL, Fig. 128), and cutting through the marks thus made to the boards. The rectangle thus left is filled in level with the leather and the endpapers pasted down and all nipped lightly, using pressing tins or celluloid sheets in the endpapers and blanket boards outside.

BOOK CRAFTS—XIX

Finishing.—All the processes in bookbinding up to the closing down of the book are included in the term "forwarding." The book may yet require to be headbanded, titled, decorated on the back and boards (inside and out), polished—these more especially refer to leather-bound books—before pasting down the endpapers. These latter stages after forwarding are all comprised in the term "finishing."

Headbanding has already been described.

For titling, type which has been set up in a type holder (Plate XL, Fig. 129) may be used, or separately handled letters. The type is easier to begin with and, in the hands of a beginner, more certain in its alignment. The handled letters allow more freedom in setting out and are perhaps preferred by the artist craftsman. Either will be used with foil or gold leaf. The foil may be had in various colours and is a good introduction to the use of real gold. It can be safely handled and is cheap. It soon tarnishes and is generally used for articles with a short life—membership cards, season ticket holders, etc. Its use gives valuable practice with the type holder, and being

cheap it is possible to use it for a great deal of practice work.

There are two kinds of foil—the prepared and the plain. The former is ready to use as bought. With the plain type, a substance known as *blocking powder* must be dusted over the paper, cloth, and leather where the foil is to be placed. The back or underside of the prepared foil has already been treated and requires no powder, though it would be safer if it had powder added.

The heated tool or type applied to the foil transfers some of its heat to the powder or prepared back, causing the foil to adhere to the cloth, etc. The spaces between the letters, not having had any heat applied, brush away, leaving the row of letters. Care must be taken to sight the front or straight edge of the type holder with the head of the book (Plate XL, Fig. 130). Apply pressure evenly all over the type face. It is wise to roll to each end slightly backwards and forwards, especially if the type has had much use and thereby has had its edges rounded somewhat, and if the line be long. Applying the heated tool is termed *striking*, and if at the right temperature, had best be done smartly. A less heat applied for a longer time will not give as clean an impression. There is, however, a correct heat. It must be learned by experience—it cannot very well be measured otherwise. It is highest for work on paper and lowest for leather; cloth comes between.

I am chary of offering advice on methods for gold, as I have experienced all the difficulties and have never surmounted them by book directions. I can now profit by written advice, but only because I have learned by practical experience.

Glair is to be used or, if desired, the blocking powder. With the powder it is well to see an experienced man take a sheet of gold from its book and flatten it out on a gold cushion. Half-a-minute's observation of an expert's methods is much better than half-an-hour's reading. If you wish to try—and it is to be hoped that you will—pass a perfectly clean, non-greasy table knife under

a sheet of gold and gently transfer it to within an inch of the gold cushion. Then drop the knife more quickly, causing the sheet to balloon itself and drop more or less flat. There will then be less chance of the corners becoming tucked under. Breathe gently over the middle, either through a cardboard or other tube, or without one. This will dispose of some or all of the creases. Cut the gold into the required sizes with a sawing action of the knife.

Gold sticks to a greasy surface, though it is not fixed to it.

Lightly powder the paper, cloth or leather. Smear a little vaseline over the left palm. Heat the holder until it is just short of the hissing stage when a wetted piece of cotton wool touches it,—the water dries off without hissing. Quickly rub the type face clean on a piece of leather-covered board. Draw the face of the type across the greased palm. Apply the type to a piece of gold and the gold adheres. Sight the holder over its position (Plate XL, Fig. 130), and press on the spot as already directed. The book will then be titled. The excess gold is removed with a piece of gold rubber—a special plastic rubber, carefully preserved in a small tin box. In time it may become a valuable nugget, the gold of which can be recovered by the refiners.

The glair for tooling is stronger than for edge gilding—the white of an egg has a dessert spoonful of pure vinegar mixed with it. This mixture is well beaten up and allowed to stand for some hours—some people suggest twenty-four hours. The liquid is poured off and is ready for use.

Using glair.—Glair stains some leathers and must be used with caution. Here are the steps when glair is employed:—

1. The title is *blinded in*—the type is slightly heated and pressed on the leather.
2. The letters on the leather are painted with glair, using a small brush—a sable brush for preference. This is allowed to dry.
3. A second similar application of glair is allowed to go tacky.

4. With a finger, a little vaseline is rubbed over and slightly beyond the area of the title.

5. With a pledget of cotton wool, greased by being rubbed along the forehead or hair, a piece of gold is lifted and lightly pressed all along the title area. The letters will show through.

6. The type is adequately heated and pressed into position.

7. The gold rubber is used.

8. Benzine removes any trace of grease.

A third method is possible with *transfer gold*—the tissue-backed kind as used by painters and gilders. This can be handled somewhat like foil and cut with the adhering tissue into pieces. The order of the process is as follows:—

1. The leather is powdered.

2. The transfer gold, tissue side uppermost of course, is placed in position—no grease is necessary.

3. The heated type is applied to the tissue backing. When the tissue is lifted, the title is left. The tissue with the adhering gold is now the gold rubber and is stored.

The disadvantage of using transfer gold is that one cannot be sure of getting a certain desired position because the tissue backing hides the surface of the leather. However, it has its uses.

Short lines across the back are put in with a tool known as a *pallet* (Plate XLI, Fig. 131). Where lines have to be put in using a *fillet* (Plate XLI, Fig. 132), these are first blinded in, using a pointed folder. Glair and grease are applied to the line area, and the fillet is heated and applied. This may sound easy, but it is not at all simple to accomplish.

I make no mention of building up an all-over design for a book front. Not many will attempt it. Fuller directions can be read in *Bookbinding and the Care of Books*, by Douglas Cockerill, published by Pitmans. This book is more concerned with what can be done by children and in school.

Obtaining experience.—This leads up to the most important point I wish to make in

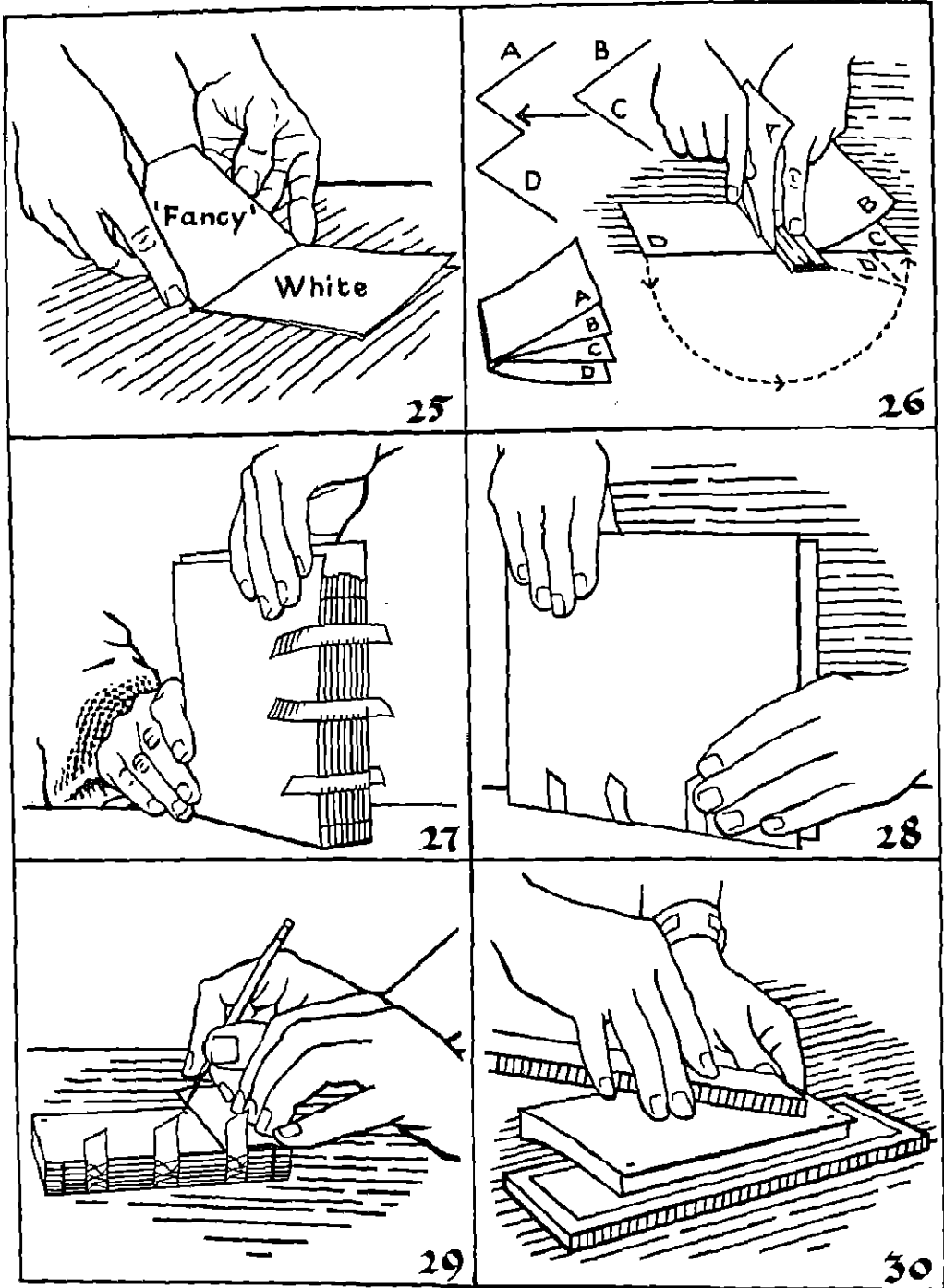
this chapter. It is absolutely essential for every ambitious student to get into touch with practical craftsmen. Gold tooling must be learned by observation. Perhaps William Shakespeare had gold tooling in mind when he wrote—"Experience is a dear school . . ."

In most parts of the country there will be a teachers' class on bookbinding at a technical college or art and craft school, or a class wisely organised by the teachers themselves. With every confidence I recommend the summer schools organised by the Educational Handwork Association at Scarborough, Aberystwyth and Bournemouth. Other associations arrange similar schools, though I have had no personal contact with them. At any of these schools, a month's intensive training gives a splendid foundation on which to build.

The master of any craft knows that he cannot learn a craft completely in a month, however hard he works. Learning requires a *spread*—thirty days' work had better be done in thirty weeks than in thirty consecutive days—but in right and willing hands, both of tutor and students, a tremendous amount of really valuable work can be done in a month of about 5½ hours a day of practical work. Add to this the time spent in reading, in discussions in the bus during rides to and from the hostels, and at meal times, and it will be realised that little time is left except for one's prayers and sleep.

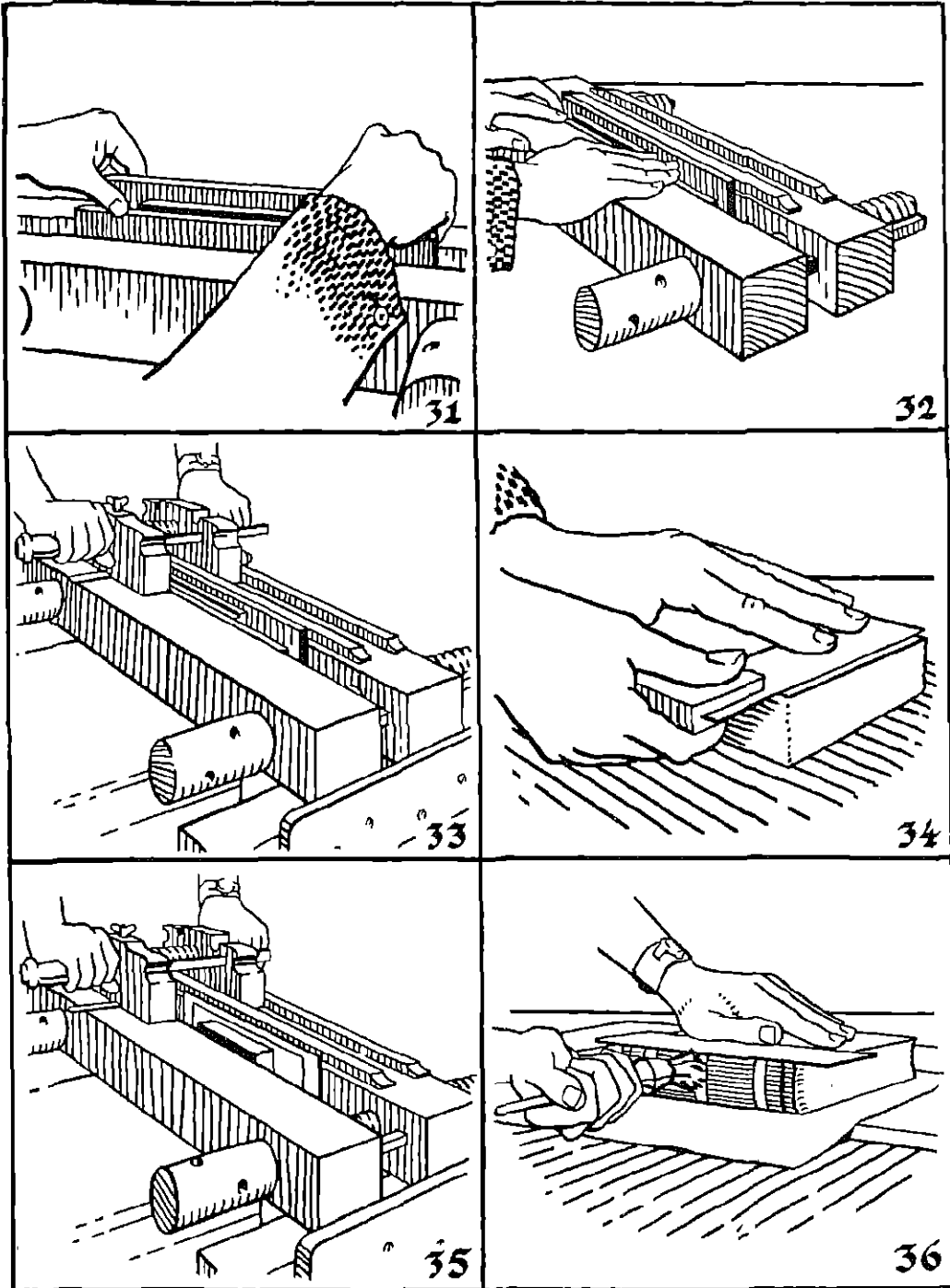
Where a class has been formed locally, it had best have some definite aim in mind. Have a goal, and what better than to prepare for an examination? Teachers like winning certificates. They certainly are a hallmark. He who is depending on the qualification obtained at the end of his probationary year is in a parlous state when up against someone armed with a number of other qualifications won after planned courses of study. It is well to crystallize one's knowledge in the form of a certificate. I know of none better for teachers than those to be sought for from the Educational Handwork Association. The certificates are

(continued on p. 81)



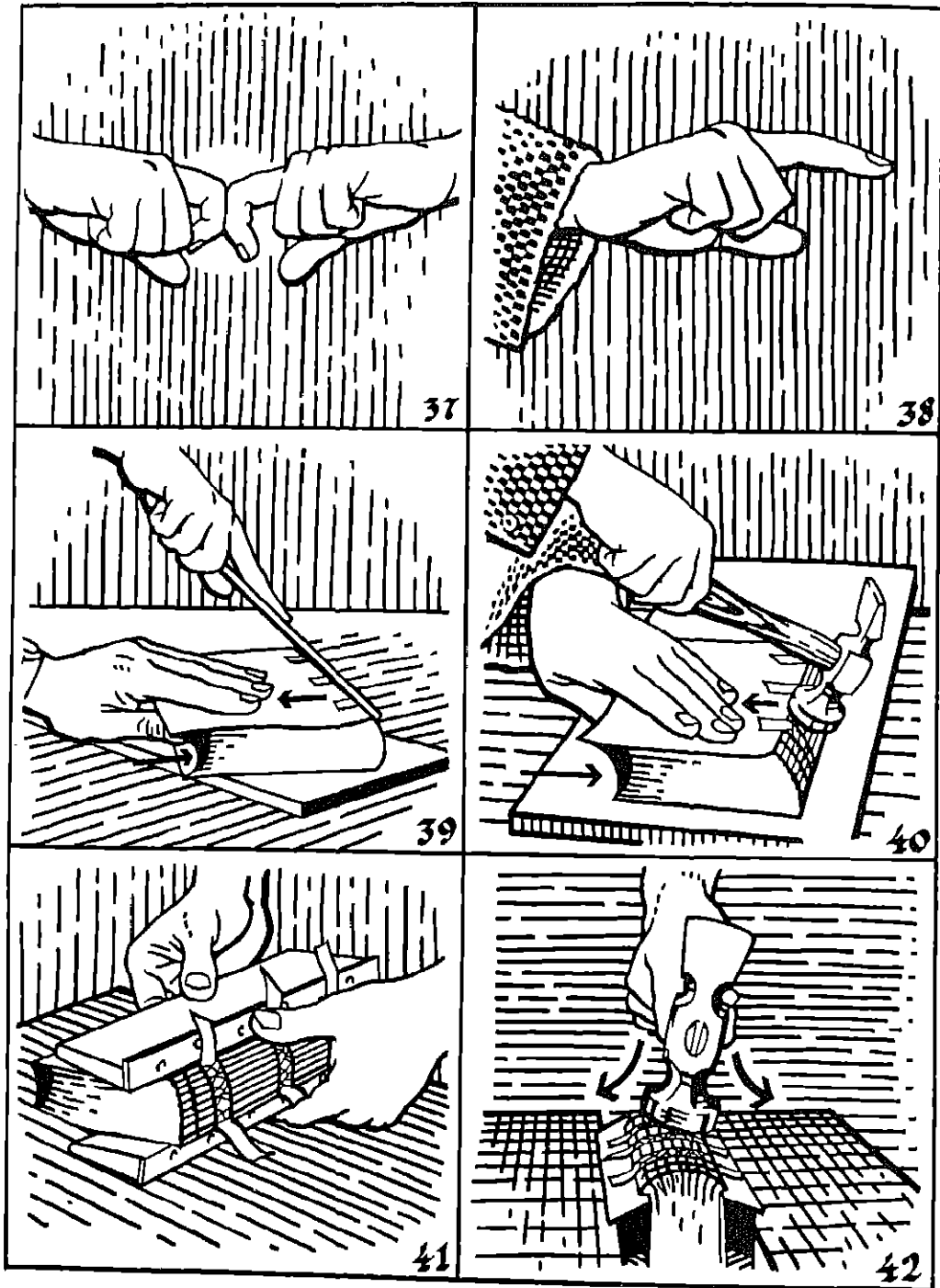
25. GLUED FANCY ATTACHED TO WHITE
 27. HOPPING BOOK ON HEAD
 29. MARKING FOREEDGE FOR CUTTING

26. FOLDING ZIGZAG ENDPAPERS
 28. HOPPING BOOK ON BACK
 30. FRONT BOARD BEING BROUGHT UP TO THE
 MARKS ON THE OUTSIDE OF THE ENDPAPERS



31. PUTTING BOOK AND BOARDS INTO PRESS
 33. BOOK IN PRESS AND PARTLY CUT
 35. BOOK IN PRESS WITH BACK TOWARDS BINDER

32. FEELING THE BOOK IN THE PRESS
 34. SQUARING HEAD
 36. GLUING BOOK BACK



37. FINGERS REPRESENTING TWO CONTIGUOUS SECTIONS

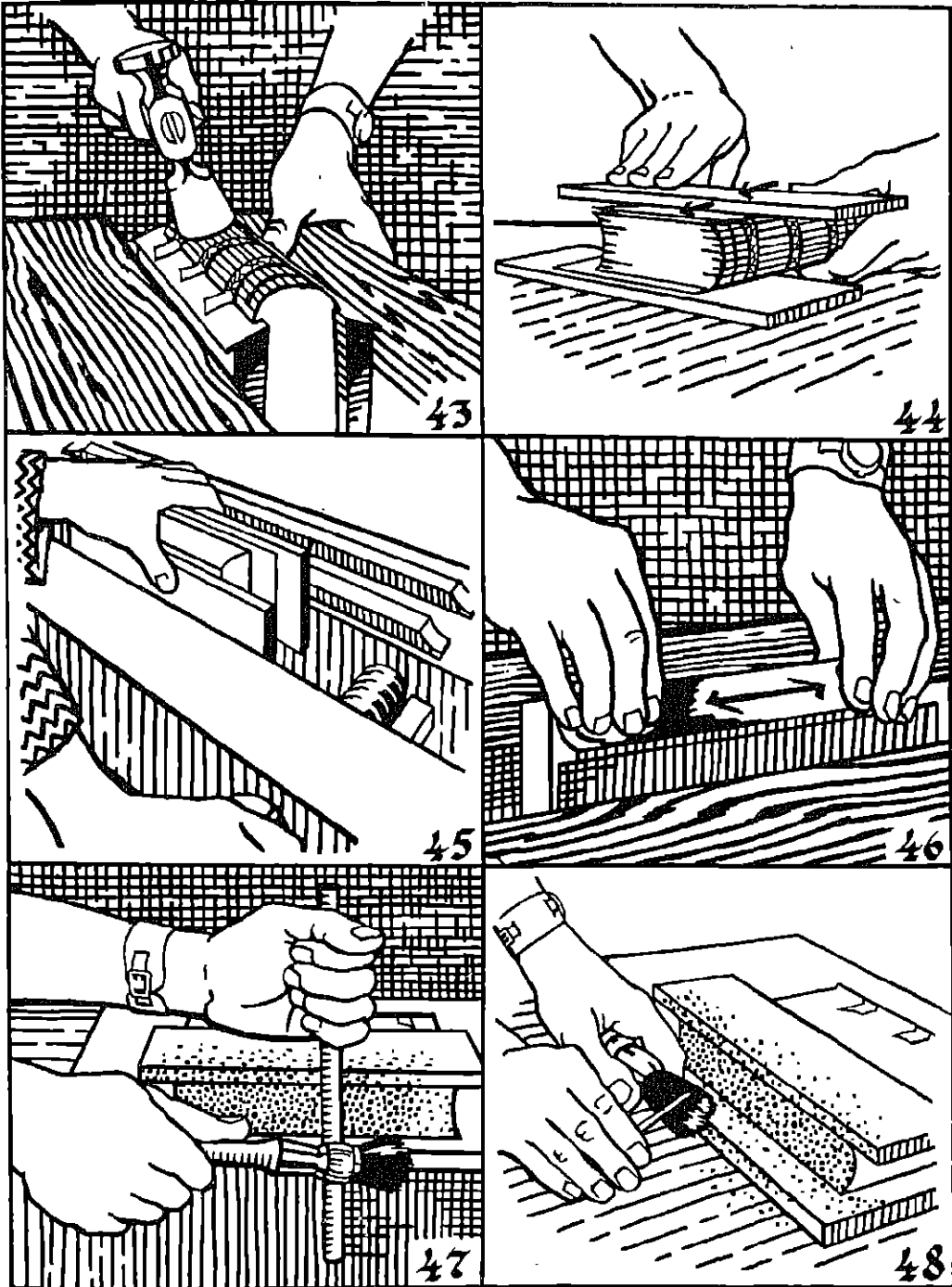
39. ROUNDING—USING A BOARD

41. PLACING BACKING BOARDS

38. DIFFICULTY IN OPENING FINGER IF EXCESS OF GLUE ON KNUCKLE—SAME WITH A SECTION

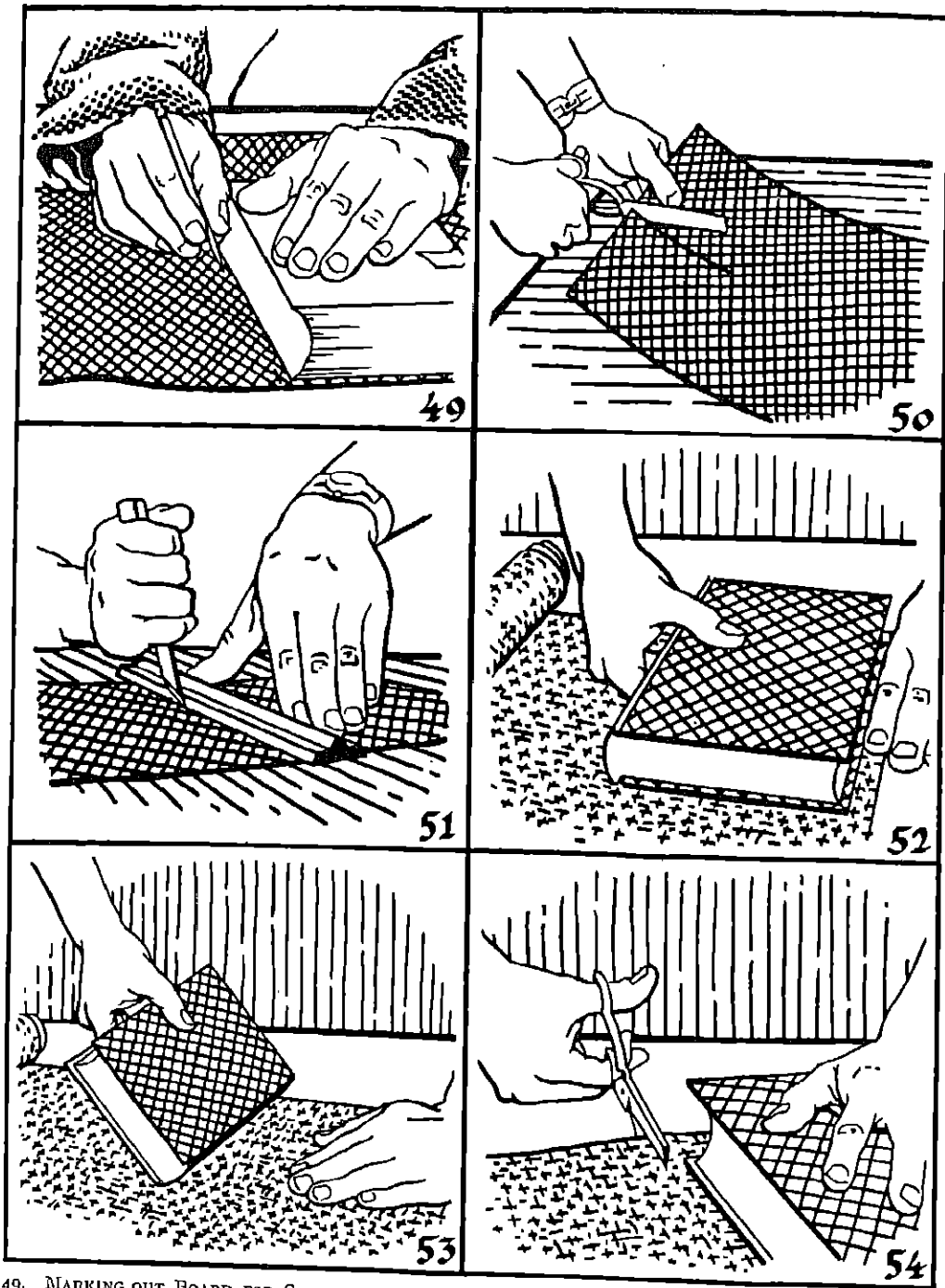
40. ROUNDING—USING A HAMMER

42. BACKING—DOWN AND OUT BLOW



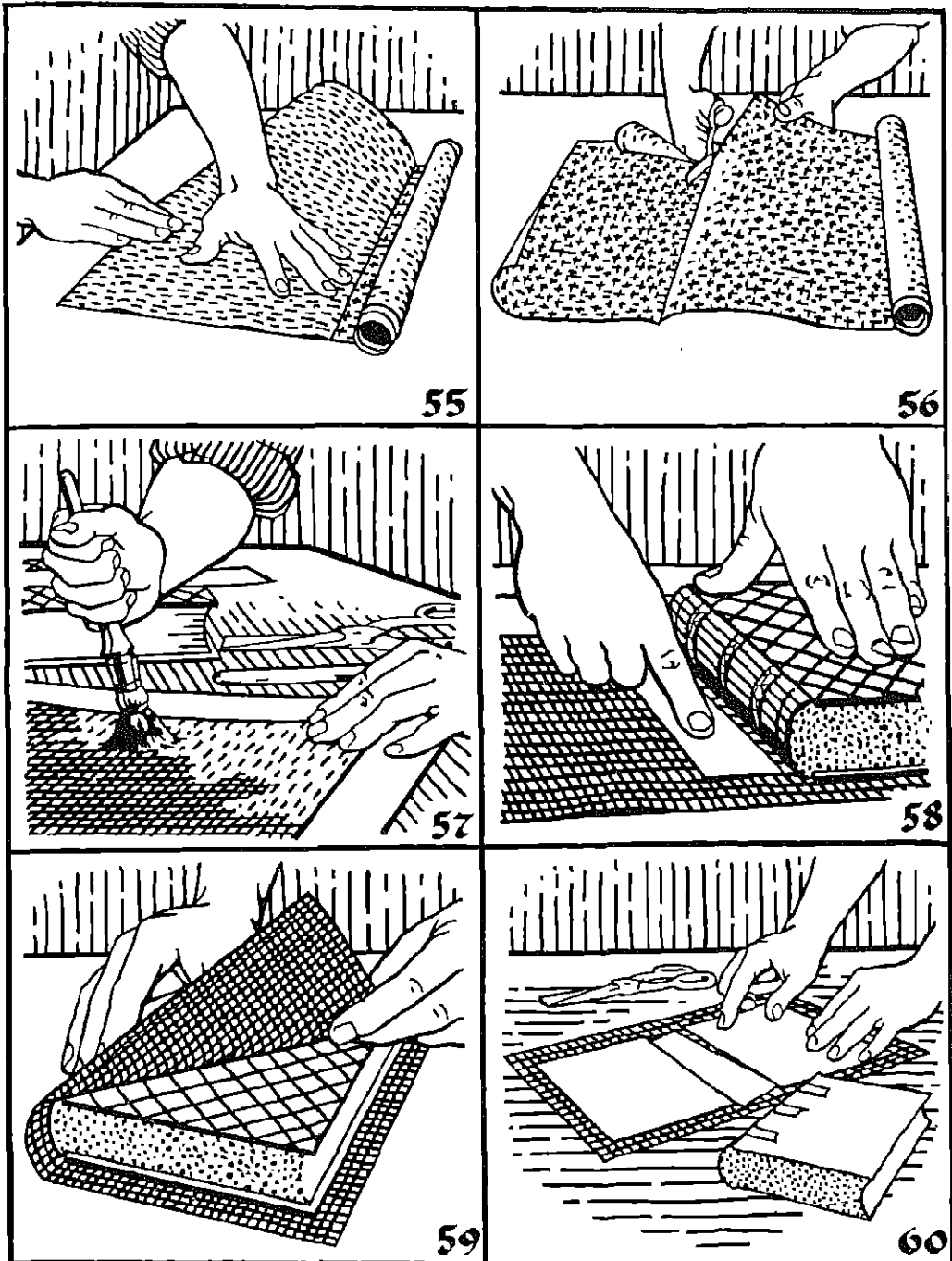
43. ROUNDING—USING A HAMMER
 45. INSERTING SANDWICH IN THE PRESS
 47. EDGE SPRINKLING—USING PRESS PIN

44. CUTTING HEAD AND TAIL AFTER BACKING AND
 PACKING
 46. WHOLE COLOURING OF FOREEDGE
 48. EDGE SPRINKLING—USING FINGER BRUSH



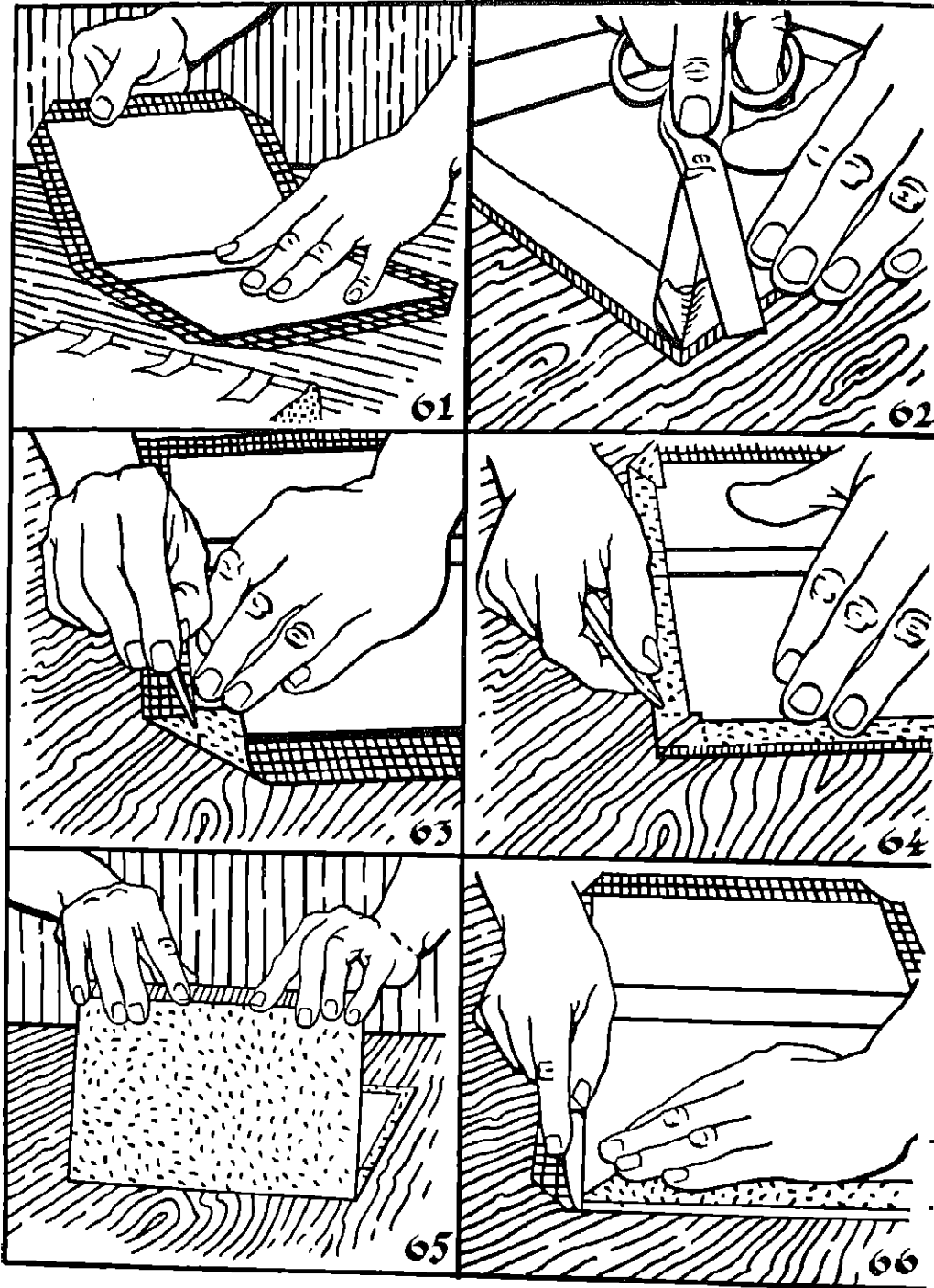
49. MARKING OUT BOARD FOR CASE
 51. CUTTING BOARD, USING KNIFE AND SAFETY RULER
 53. SECOND STAGE IN GETTING OUT CLOTH FOR COVERING CASE

50. CUTTING BOARD, USING SHEARS
 52. FIRST STAGE IN GETTING OUT CLOTH FOR COVERING CASE
 54. THIRD STAGE IN GETTING OUT CLOTH FOR COVERING CASE



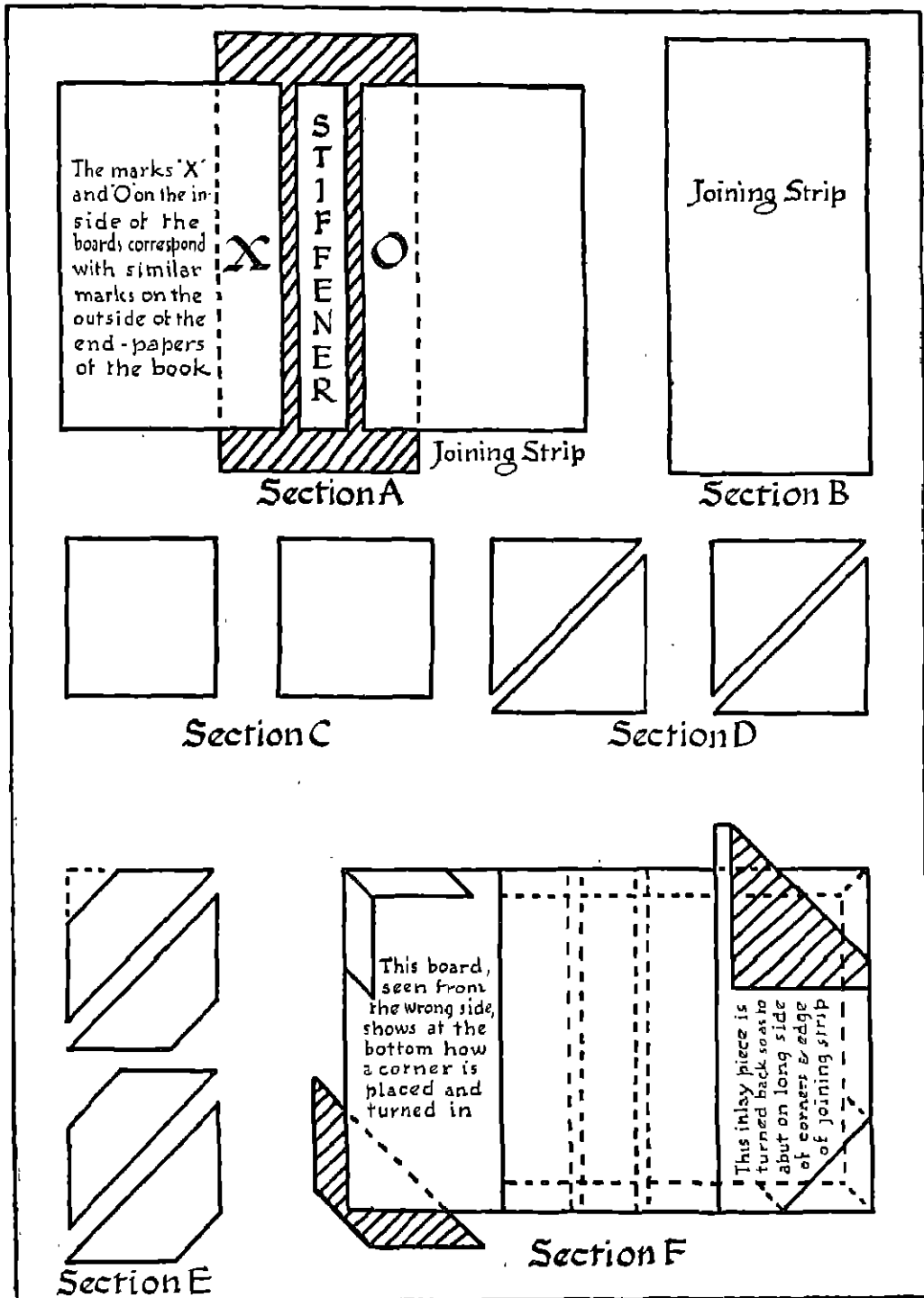
55. SECOND STAGE OF CUTTING OUT CLOTH FOR COVERING—THE NEAR EDGES COINCIDING, THE CLOTH IS FOLDED FROM THE NIP MADE IN FIG. 43
57. GLUING CLOTH
59. CLOTH BEING BROUGHT OVER

56. A SHEARS IS RUN ACROSS THE CREASE MADE IN FIG. 44.
58. PLACING STIFFENER
60. STIFFENER FOUND OUT OF PLACE

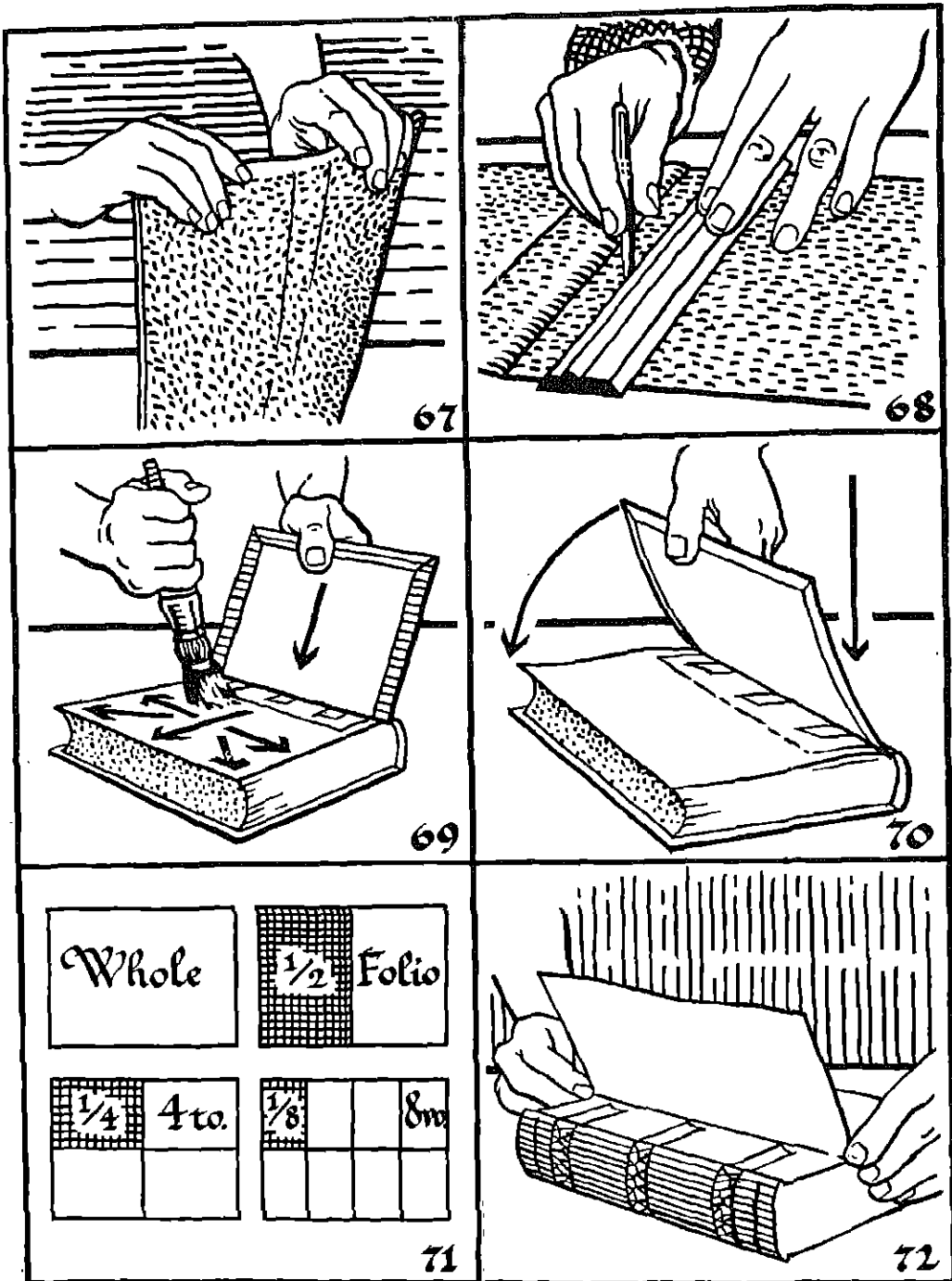


61. CORNERS MITRED
63. CORNERS IN LIBRARY BINDING
65. TURNING IN FOREEDGE

62. ANOTHER METHOD OF TREATING CORNERS
64. FINISHED CORNER IN LIBRARY BINDING
66. NIPPING DOWN CORNERS

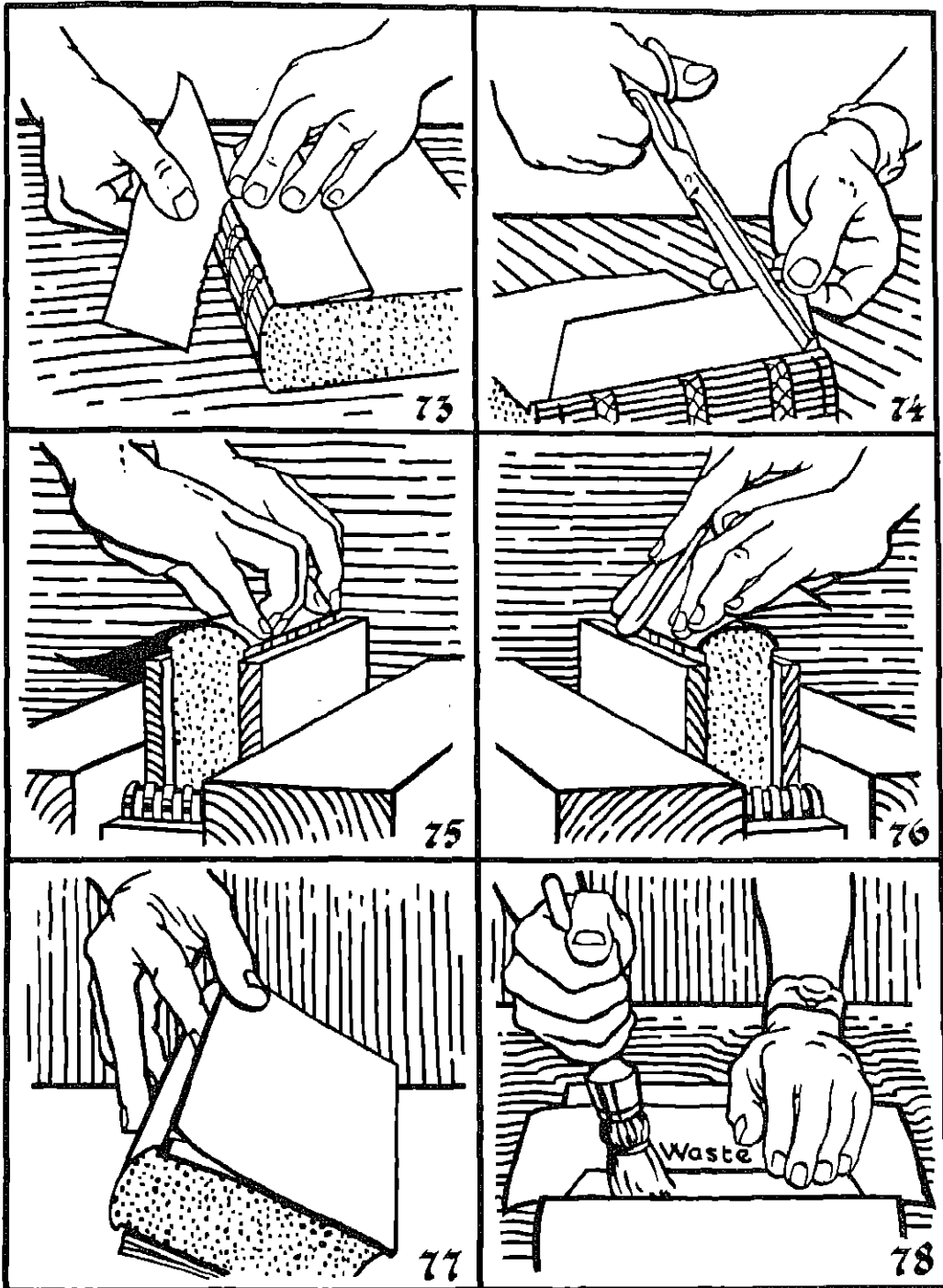


MAKING A HALF-BOUND CASE.



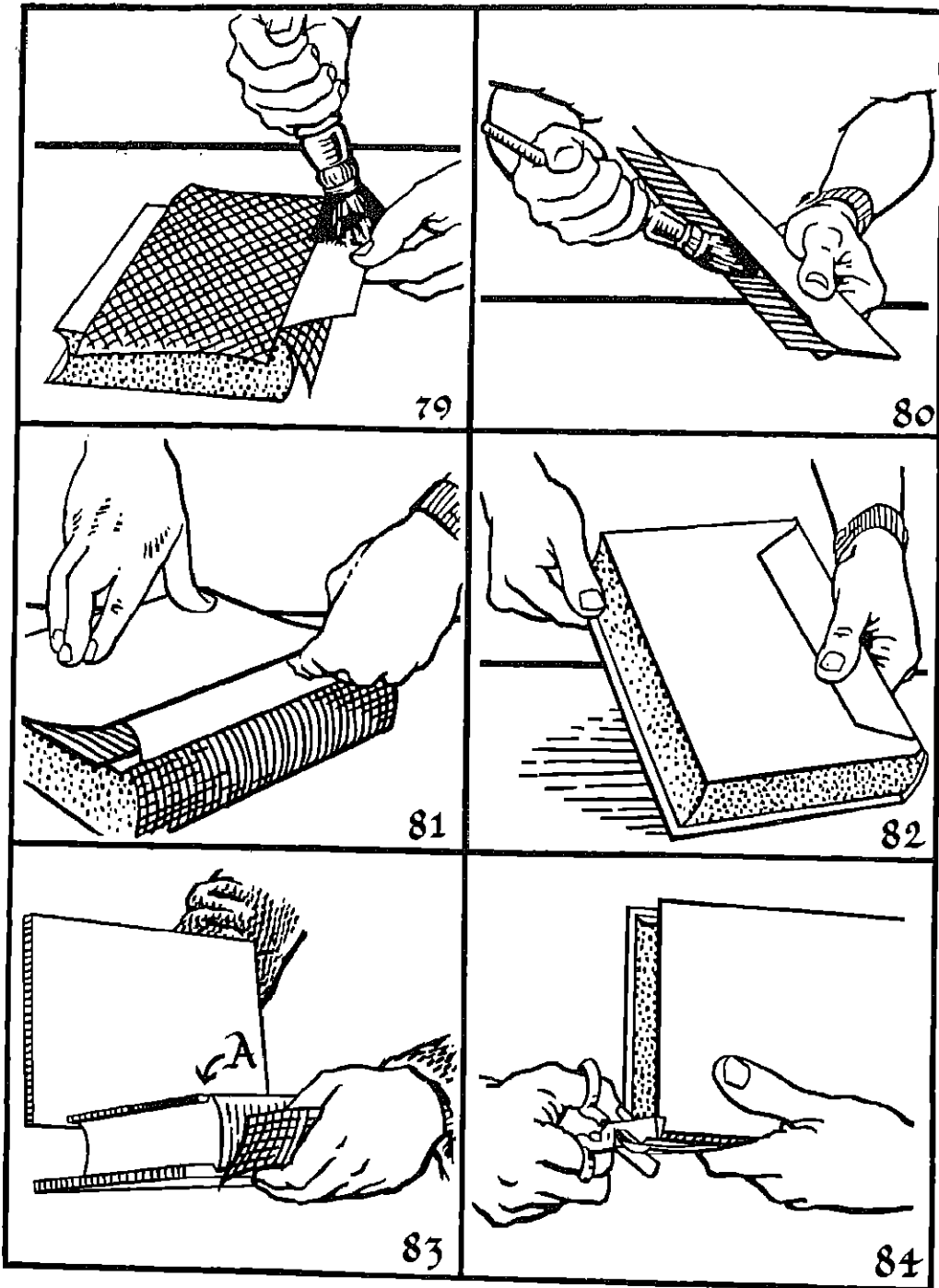
67. FOLDING CLOTH OVER CASE HEAD
 69. GLUING ENDPAPER PREPARATORY TO CLOSING DOWN
 71. PAPER SIZES—WHOLE, HALF, QUARTO, OCTAVO

68. BLIND TOOLING
 70. CLOSING DOWN
 72. SPLIT BOARDS—FOLDING WASTE OVER TAPES



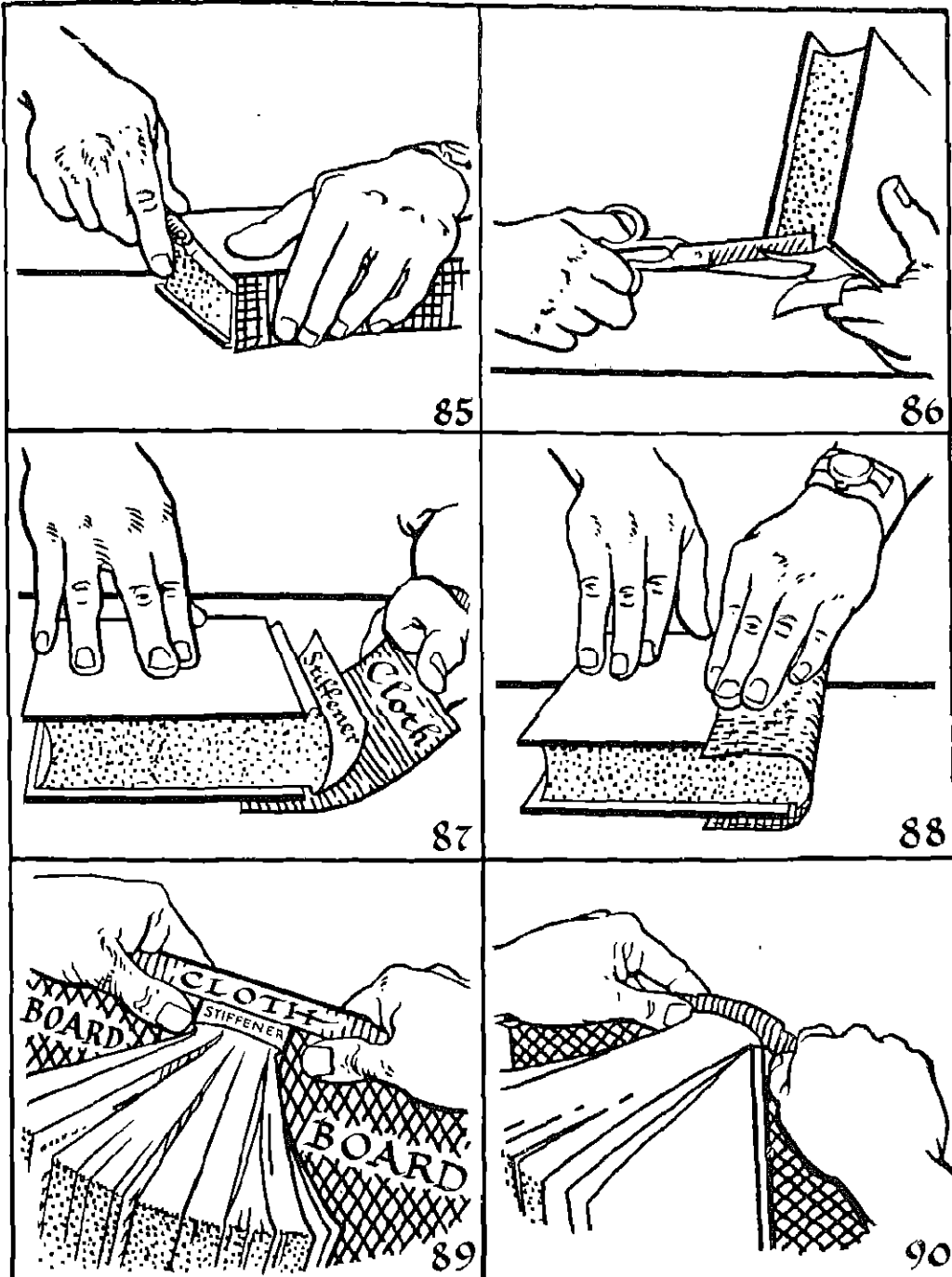
73. SPLIT BOARDS—TEARING OFF WASTE OF STIFFENER
 75. SPLIT BOARDS—GLUING FLAP, FIRST STAGE
 77. SPLIT BOARDS—SPLITS SHOWN

74. SPLIT BOARDS—SHAPING FLAP
 76. SPLIT BOARDS—FOLDING STIFFENER
 78. SPLIT BOARDS—GLUING FLAP, SECOND STAGE



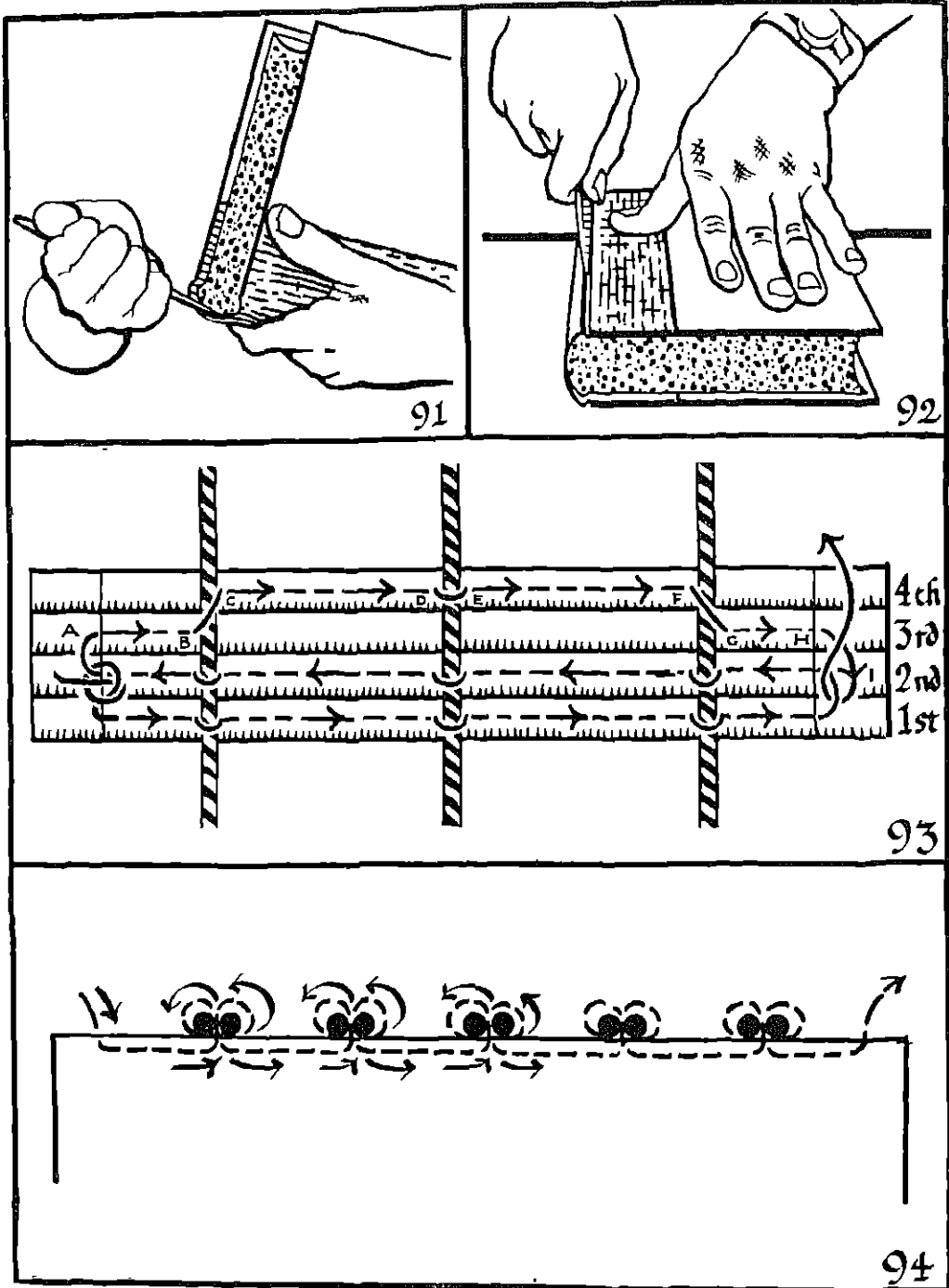
79. SPLIT BOARDS—GLUING FLAP, THIRD STAGE
 81. SPLIT BOARDS—INSERTING GLUED FLAP IN
 BOARDS
 83. SPLIT BOARDS—SHOWING FRENCH JOINT (A)

80. SPLIT BOARDS—GLUING SPLIT
 82. SPLIT BOARDS—SETTING SQUARES
 84. SPLIT BOARDS—STIFFENER TO SIZE OF
 BOARDS

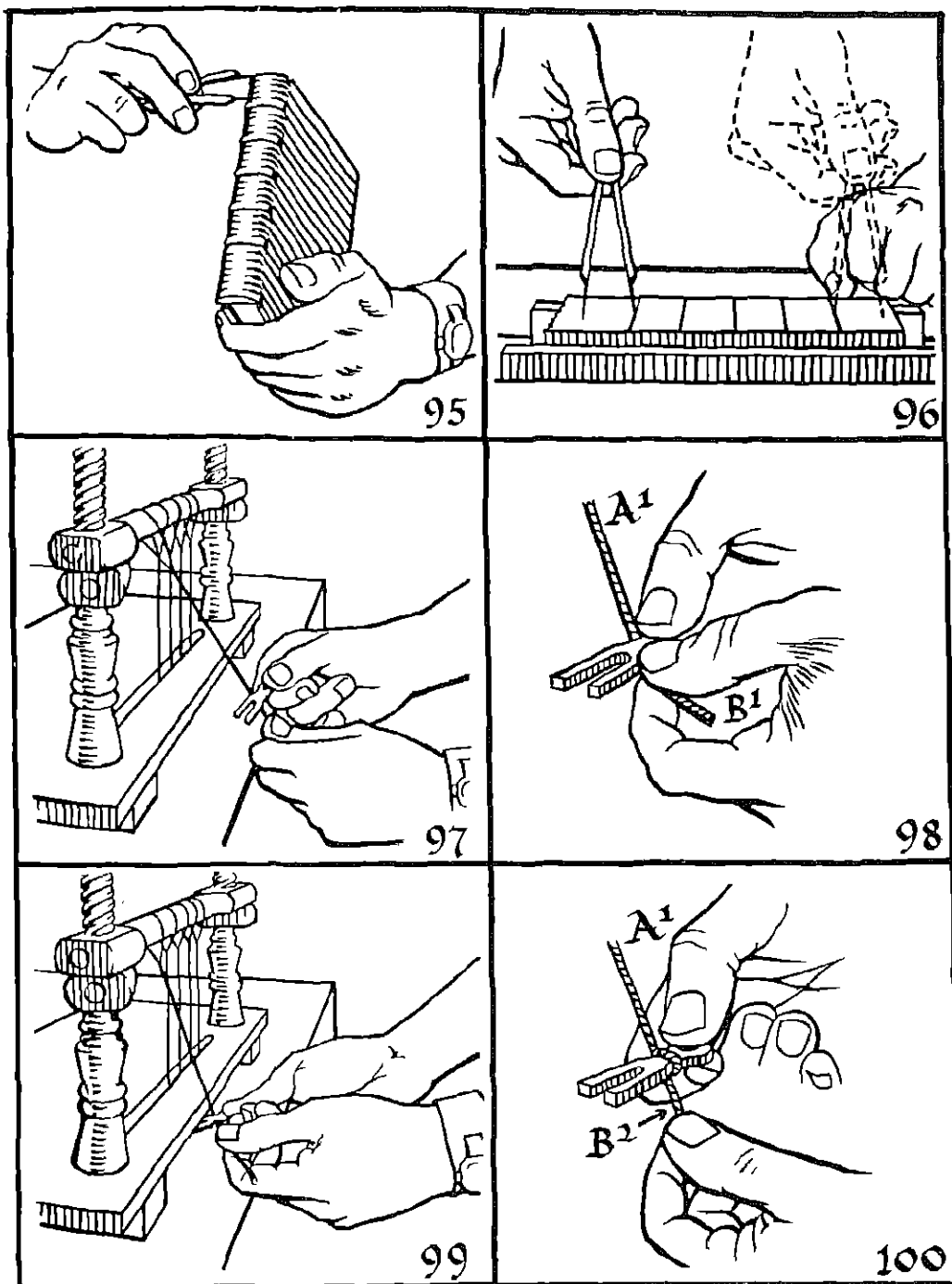


85. SPLIT BOARDS—SLITTING STIFFENER AT HEAD AND TAIL
 87. SPLIT BOARDS—GLUED CLOTH BROUGHT ROUND STIFFENER
 89. SPLIT BOARDS—TURNING AT HEAD OR TAIL

86. SPLIT BOARDS—STIFFENER TO SIZE OF BOOK
 88. SPLIT BOARDS—CLOTH BROUGHT ROUND BACK
 90. SPLIT BOARDS—CLOTH TURNED IN

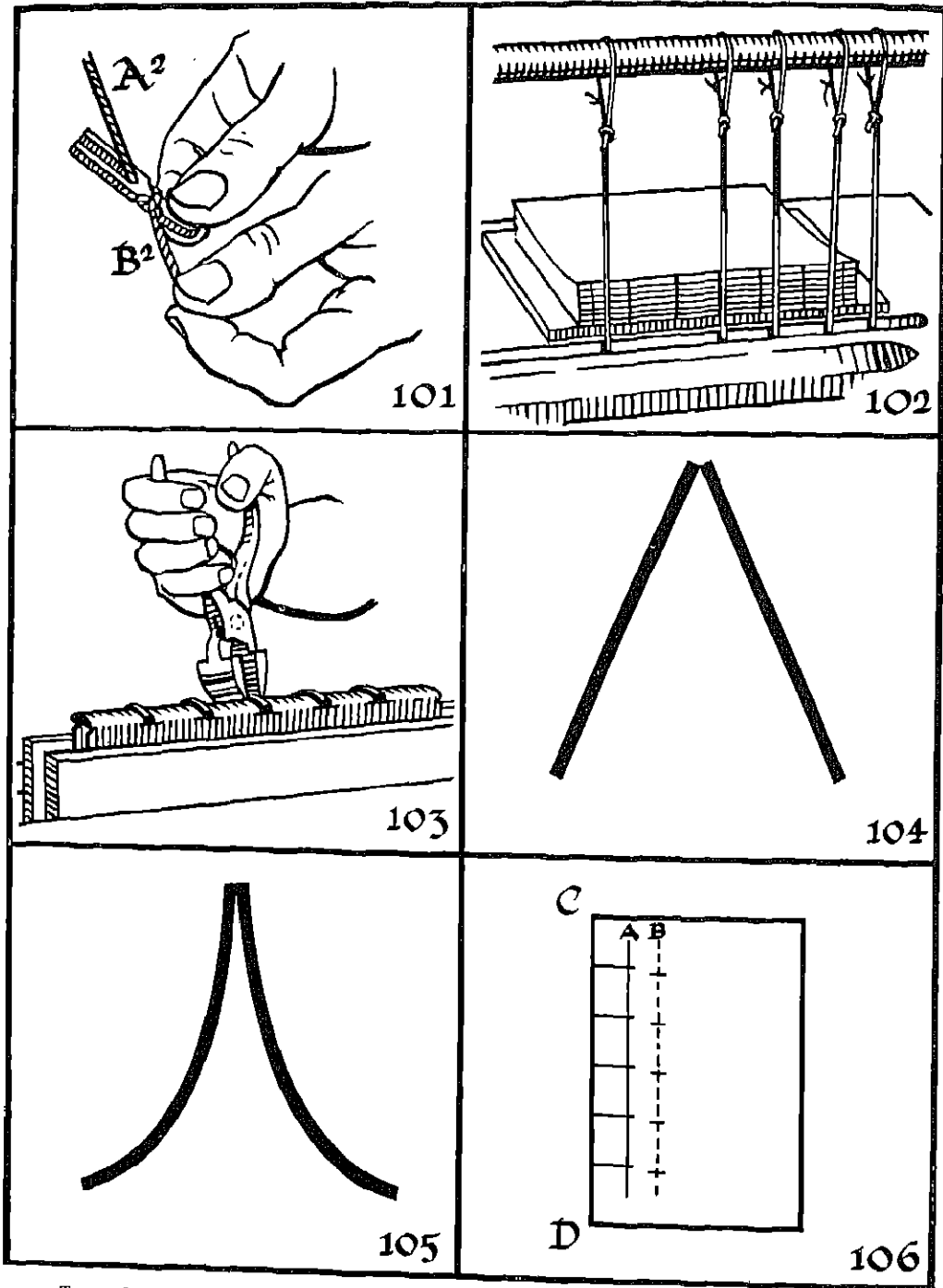


91. SPLIT BOARDS—INSURING CONTACT AT HEAD AND TAIL
 92. SPLIT BOARDS—RUBBING CLOTH INTO FRENCH JOINT
 93. PATH OF THREADING IN SEWING "TWO-ON"
 94. SEWING IN FLEXIBLE BINDING



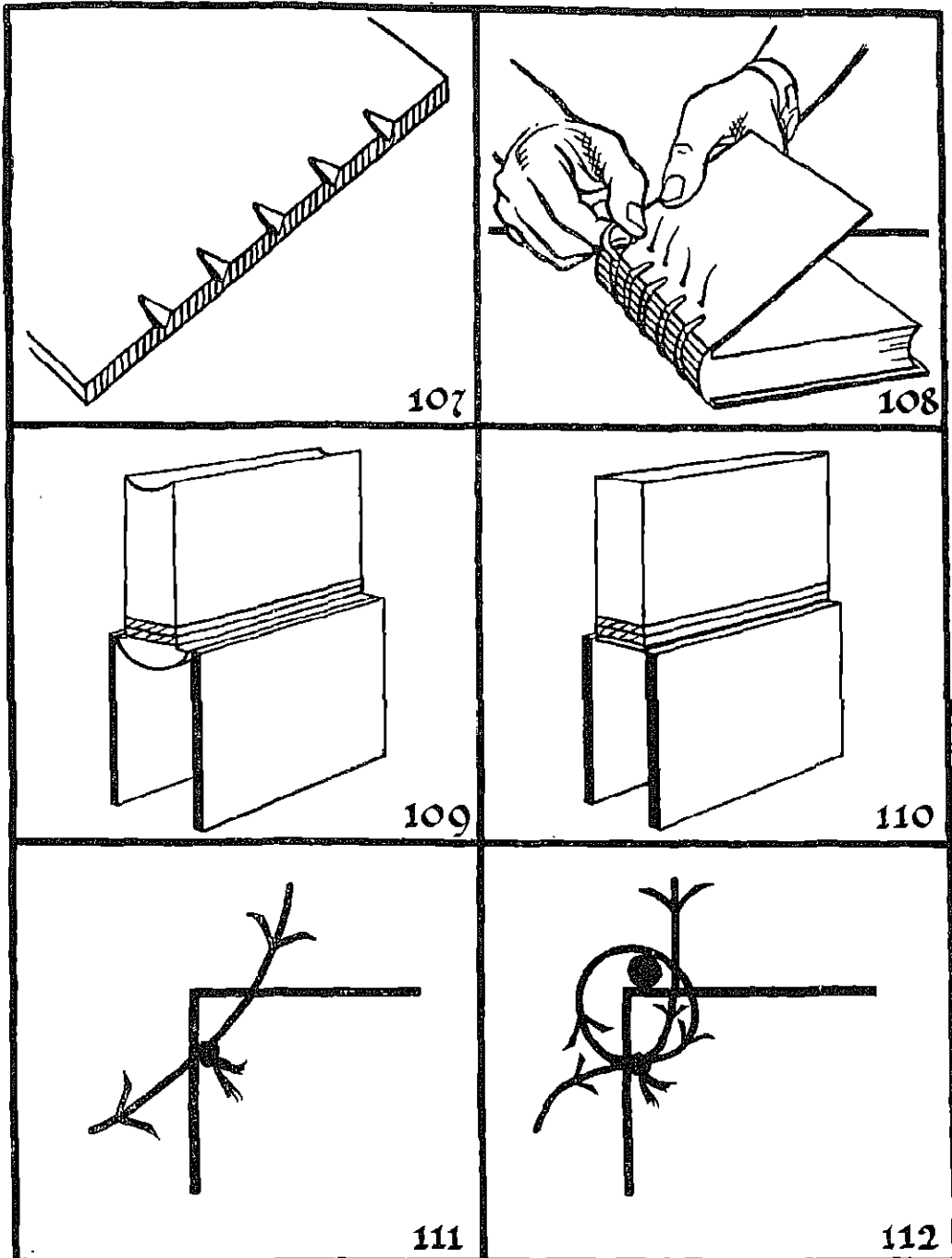
95. BOOK BACK IN FLEXIBLE BINDING—TAIL.
 PANEL LONGEST
 97. SEWING KEY AND CORD
 99. GETTING RIGHT LENGTH OF CORD

96. MARKING OUT BACK FOR FLEXIBLE BINDING
 98. METHOD OF HOLDING KEY AND CORD
 100. SECOND STAGE IN PLACING THE KEY



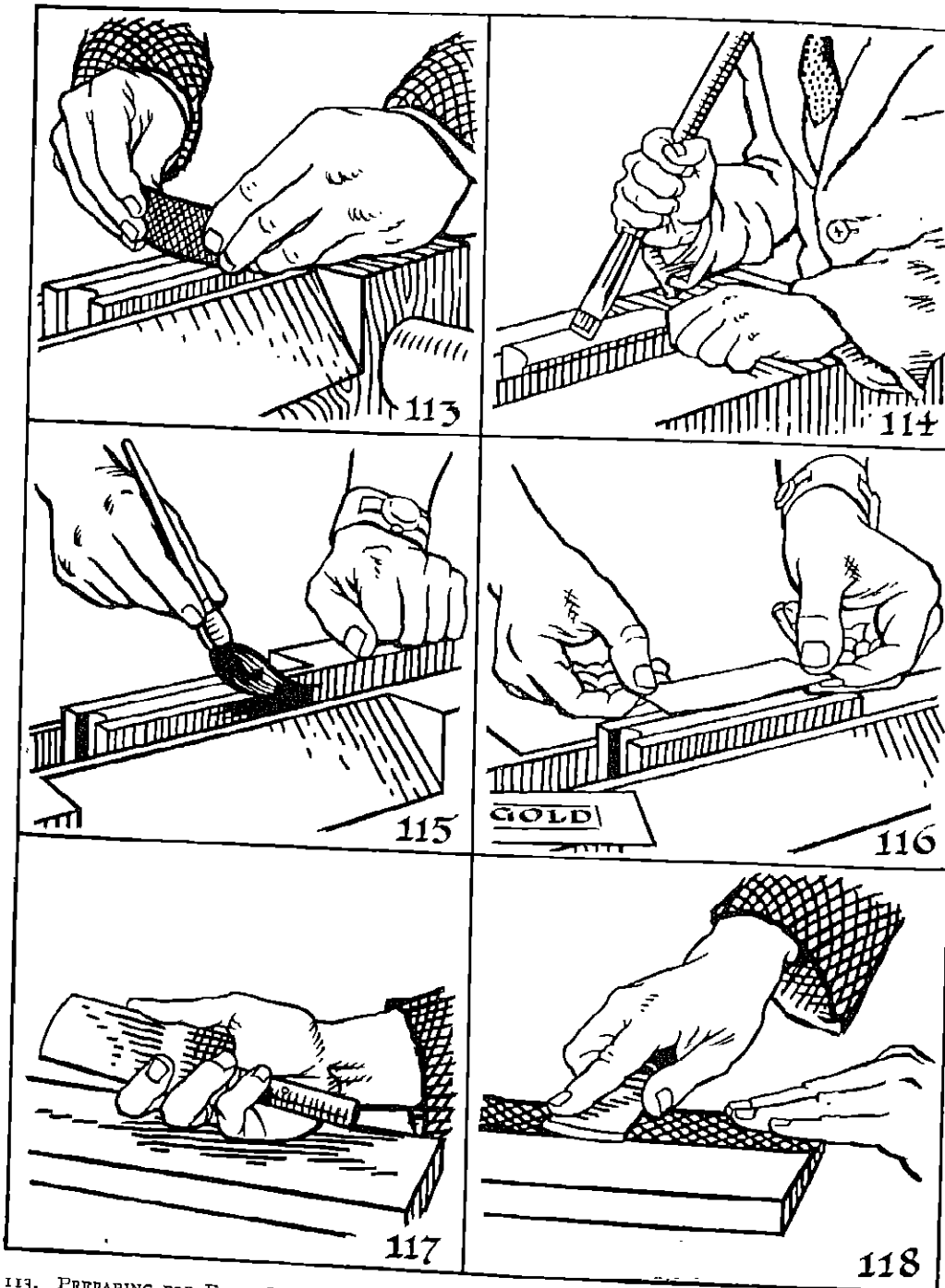
101. THIRD STAGE IN PLACING KEY
 103. USING BAND NIPPERS
 105. MILLBOARDS WHEN DRY,—CONCAVITY EX-
 AGGERATED

102. CORDS TO BE MOVED INTO LINE WITH THE
 MARKS ON THE BOOK BACK
 104. LINED MILLBOARD SET UP TO DRY
 106. MILLBOARDS MARKED OUT



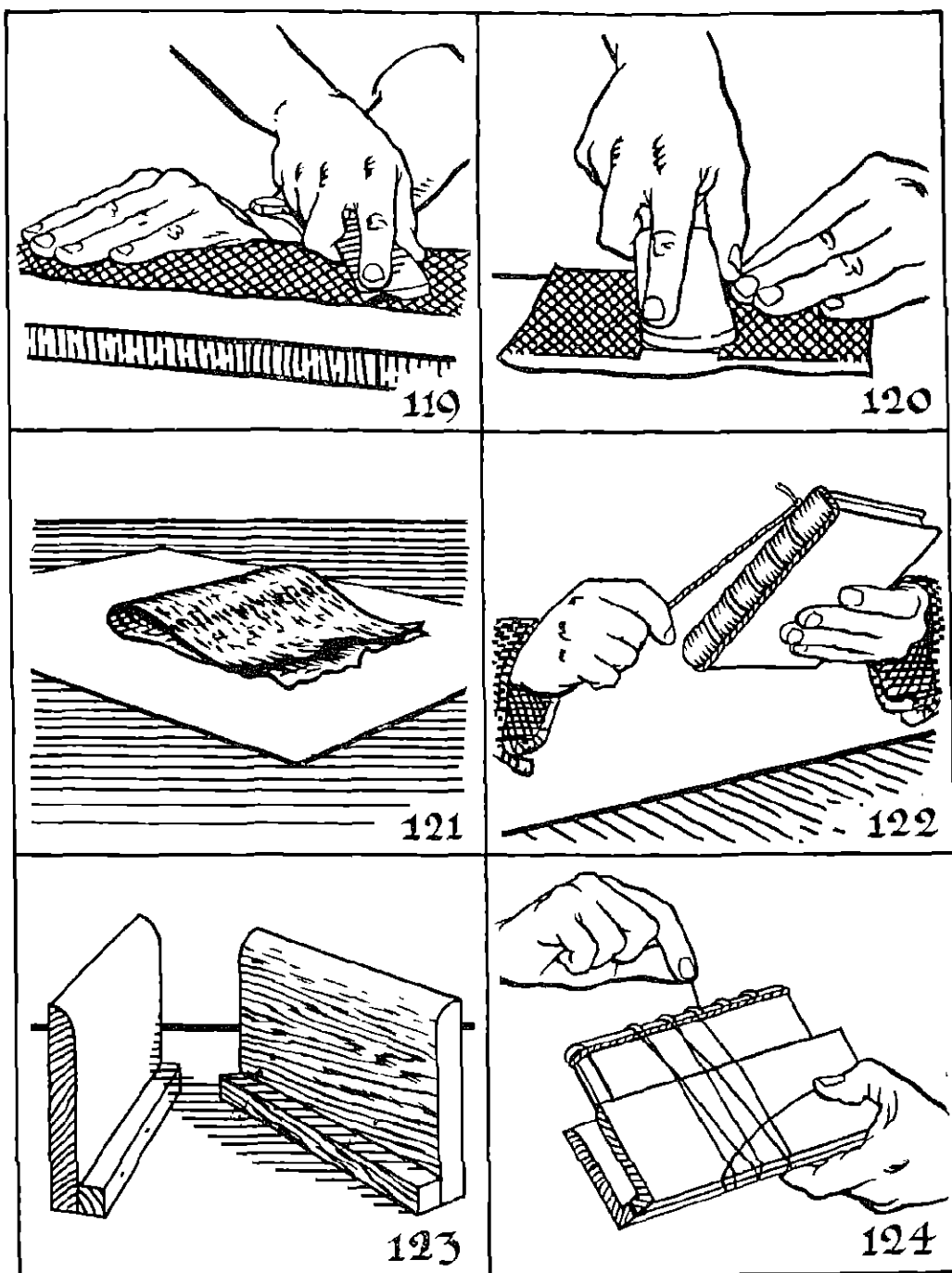
107. V-SHAPED GROOVES AT BACK EDGES OF
BOARDS TO TAKE THE CORDS
109. SOFT CORD OR COTTON TAPE PUT ROUND
BOOK
111. SILKS DRAWN THROUGH BELOW KETTLE
STITCH CUT AS FAR AS KNOT

108. LACING IN THE POINTED CORDS
110. BOOK BACK FLATTENED AND TAPE DRAWN
TIGHTLY
112. ONE SILK DRAWN ROUND HEAD BAND
LINING AND THROUGH KETTLE STITCH
CUT A SECOND TIME



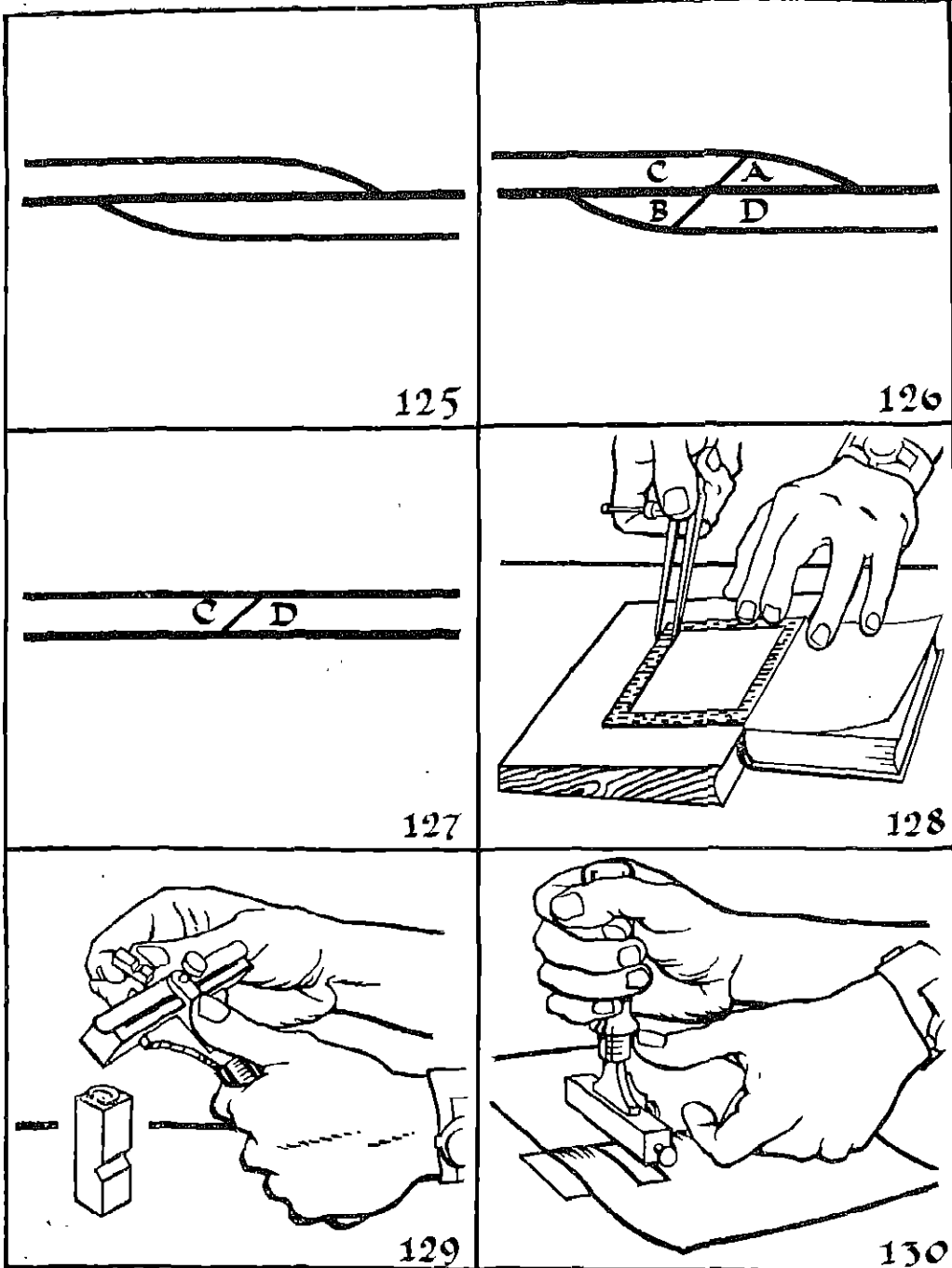
113. PREPARING FOR EDGE GILDING—SCRAPING
 115. APPLYING GLAIR TO EDGE WITH SOFT MOP
 117. METHOD OF HOLDING PARING KNIFE

114. BURNISHING EDGE AFTER APPLYING BOLE
 116. GOLD BEING LIFTED WITH THE AID OF
 LIGHTLY GREASED PAPER AND DROPPED
 ON GLAIRED EDGE
 118. LEATHER PARING TO THE RIGHT



119. LEATHER PARING TO THE LEFT
 121. PASTED LEATHER FOLDED AND LEFT TO SOAK
 123. SPECIAL BOARDS USED IN FINAL STAGE OF TYING UP

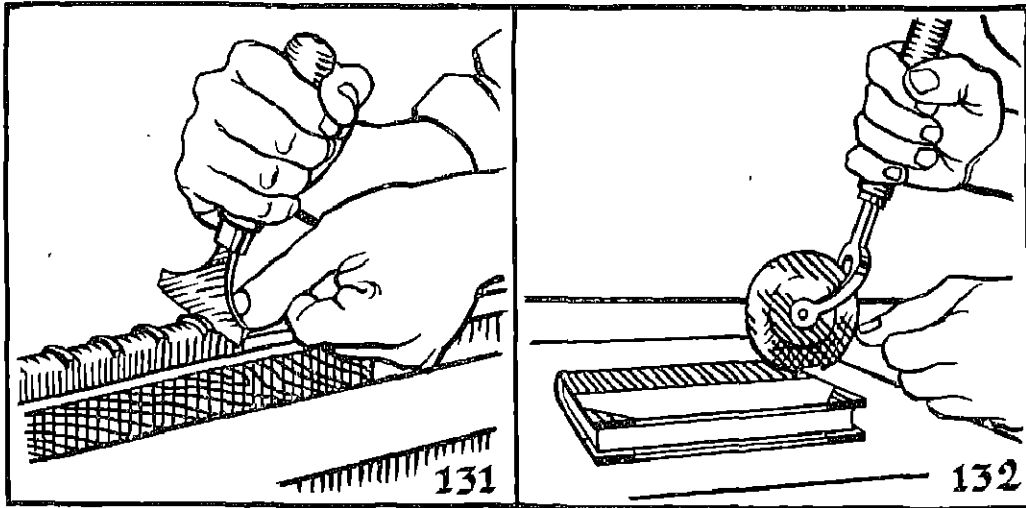
120. PARING LEATHER AT THE HEAD
 122. TYING UP LEATHER COVERED BOOK
 124. CORDS OR TAPES BEING LACED ROUND THE BOOK



125. LEATHER OVERLAPPING AT THE CORNERS
 127. A AND B REMOVED ALLOWING C AND D
 TO MEET
 129. SETTING UP TYPE

126. SLANTING CUT MADE THROUGH BOTH
 LEATHERS
 128. MARKING OUT AN EVEN MARGIN ON THE
 LEATHER INSIDE THE BOARDS, USING
 SPRING DIVIDERS
 130. TITLING BOOK BACK

PLATE XLI



131. ONE METHOD OF USING THE PALLET

132. METHOD OF USING FILLET

granted by experts and, not being lightly won, are of value.

Hard working, gifted students at the summer schools can get an advanced certificate in a month and do so with credit or distinction. These, however, are generally those who took the subject during training, or are masters of another craft. It can, however, I think, be safely said, that a good earnest student can get an advanced certificate in a month.

The Educational Handwork Association's syllabuses in elementary book crafts and bookbinding are included by kind permission of that body (see page 83).

SUGGESTED SCHEME IN BOOK-BINDING PROPER FOR SENIOR PUPILS

If all children were equally gifted our eight plus, nine plus, and ten plus schemes would be completed in the junior school and bookbinding proper would commence when these children came into the senior school.

As a matter of fact, many children in the senior school will still have to continue with the junior schemes, as the following scheme, especially if using printed books, would lead to destruction of the book and no progress for the child.

The following processes will enter into the senior scheme and are given in their proper order:—

1. *Pulling*.—Taking asunder, if a book is already bound, or *Folding* if, as advised, 8vo. cartridge paper is used for the first few books (Plate V, Fig. 1).

2. *Knocking-down*.—Removing the bend at the back of the sections or making cartridge paper thinner at the joint (Plate V, Figs. 3 and 4).

3. *Guarding*.—If necessary, the general rule is—"Inside, outside, outside, inside."

4. *Marking-up*.—For sewing, using old holes if possible, to avoid further mutilation (Plate V, Fig. 5).

5. *Sewing*.—Mainly on tapes and "all-along" (Plate XIX, Figs. 8 and 9). In the third year the encyclopaedia type of book

may be done "two-on" on cords (Plate XXXIV, Fig. 93).

6. *Attaching endpapers.*—"Tipped on" in the first year (Plate XXI, Fig. 22). Zigzag method should not be attempted before the second or third year (Plate XXI, Figs. 23 and 24; Plate XXII, Figs. 25 and 26). In the third year, a cloth joint might be attempted.

7. *Marking foredge.*—Preparing for cutting (Plate XXII, Fig. 29).

8. *Cutting foredge.*—(Plate XXII, Fig. 30; Plate XXIII, Figs. 31-33).

9. *Squaring head and tail.*—On opposite sides (Plate XXIII, Fig. 34).

10. *Cutting head and tail.*—(Plate XXIII, Fig. 35).

11. *Gluing back.*—(Plate XXIII, Fig. 36; Plate XXIV, Figs. 37 and 38).

12. *Rounding.*—(Plate XXIV, Figs. 39 and 40).

13. *Backing.*—(Plate XXIV, Figs. 40-42; Plate XXV, Fig. 43).

It may be necessary, owing to undue swelling of the back, to work in the following order:—8, 9, 11, 12, 13, packing, 10 (Plate XXV, Figs. 44 and 45).

14. *Colouring edges.*—Whole or sprinkled; burnishing (Plate XXV, Figs. 46-48).

15. *Marking and cutting boards.*—(Plate XXVI, Figs. 49-51).

16. *Cutting stiffener.*—Cut stiffener the length of the boards and the width of the back of the book.

17. *Cutting cloth.*—Right across the piece (Plate XXVI, Figs. 52-54; Plate XXVII, Figs. 55 and 56).

18. *Gluing cloth.*—(Plate XXVII, Fig. 57).

19. *Laying-on book.*—(Plate XXVII, Fig. 58).

20. *Laying-on stiffener.*—(Plate XXVII, Fig. 58).

21. *Cloth brought over.*—(Plate XXVII, Fig. 59).

22. *Removing book.*—(Plate XXVII, Fig. 60).

23. *Mitring corners.*—(Plate XXVIII, Figs. 61 and 62).

24. *Turning-in cloth.*—(Plate XXVIII, Figs. 63-66; Plate XXX, Fig. 67). The case is now completed.

25. *Design on case.*—Blind tooling (Plate XXX, Fig. 68). Indian Ink, Poster Colour (Plate XX, Fig. 14, and Class Picture No 123 in the Portfolio).

26. *Tinting.*—With pen or brush.

27. *Closing down.*—(Plate XXX, Figs. 69 and 70).

28. *Nipping.*

At the risk of becoming tiresome, I would again repeat that the aim of all craftwork should be the production of a fine piece of work in a fine way; the creation of a real, live pride in craftsmanship; the realisation and teaching of the fact that great craftsmen help to make a great nation even greater.

He who knows every Eastern dialect, or who can confound Epstein, but cannot put a hinge on the garden gate or a rubber heel on his boot is probably not as useful a citizen as our cobblers or coopers, tinsmiths or typists, painters or plumbers, sign-writers or sailors, moulders or masons.



E.H.A. EXAMINATIONS BOARD GENERAL ELEMENTARY BOOK CRAFTS

SYLLABUS OF WORK

This Course is intended as a preliminary to later specialisation in one of the branches of Book Crafts, viz.: Bookbinding, Letterpress Printing, or Book Illustration. Whatever be the course ultimately followed, it is regarded as essential that no teacher of any branch of the Book Crafts should fail to make a study of the elements of all the activities which make up the group of crafts which is known by that name.

Teachers who may not have the opportunity to do advanced work in any branch will find in this Course a useful group of related activities appropriate to the needs of children of school age.

Although the Course includes several different types of work, they should all be regarded as constructive or decorative processes directed to the one end—the making and decoration of written or printed records, *i.e.*, the Book Crafts as a whole.

While sound workmanship and a thorough grasp of even the simplest technique are essential to success in this as in all crafts, students will hardly need to be reminded of the equal importance of the development of sound standards of taste in matters of selection and design. They are strongly urged either to precede or to follow this Course by the general Course of Art for Schools.

Certificates of Competency in Elementary Book Crafts will be granted for success in both (a) an approved course of preparation, and (b) an examination as outlined below. To be qualified to sit for the examination each candidate must be certified as having completed a satisfactory course covering the syllabus.

To satisfy the Examiner it will be necessary to gain credit in each of the following sections: (a) **Course Work**, (b) **Theory**, and (c) **Practical Test**.

The Theory Paper (*Three Hours*) will consist of questions designed to test the candidate's knowledge of (a) The technique of the craft. (b) The equipment and materials used, their correct specifications for ordering, their maintenance and storage. (c) The framing of simple schemes of work in Elementary Book Crafts. (d) The management of large and small groups of pupils engaged in practising the craft.

The Practical Test (*Four Hours*) will be designed to test the candidate's ability to execute various essential processes included in the course, and may contain opportunities for the expression of individual taste in design and decoration.

Course of Work.—Although for convenience in setting out the syllabus, constructive work, lettering and the various decorative processes are mentioned separately, it should be clearly understood that from the earliest stages each of these processes should be considered in its due relationship to the finished article. Thus, proficiency in lettering and decorative processes should proceed side by side with the mastery of constructional work. Whenever they may be appropriate, lettering and decoration should be included in the finished product at every stage of the course.

Constructional Work.—

Note.—The use of strong manilla papers of subdued tints is suggested for constructive work where no cardboard is used, as in

envelopes, folders, etc. For cover papers to be used over cardboard the free use of pastel papers, decorated with restraint and due exercise of taste by the pupil is to be preferred to the too free use of ready printed patterned papers. While some knowledge of these is expected, their extensive use in schools is handicapped by the cost of most of the more tasteful patterns. Suitable papers may also be obtained from wall-paper pattern books, but here again the greatest restraint and discrimination in selection should be exercised. The use of papers in which leather, canvas, etc., are deliberately imitated should be avoided. Not only are they usually less attractive to young children, but they offer little scope for the highly educational activities of design and decoration; moreover the use of counterfeits should be discouraged in all sound craftwork.

(The following activities are not necessarily shown in the order in which they would be introduced in a scheme of work.)

1. The making of envelopes, folders, pockets, etc., from manilla paper, without using cardboard or cloth. The principle of obtaining the size and development of the finished article by direct folding of the sheet of stock size, rather than the geometrical setting out of arbitrarily chosen sizes, should be duly observed.

2. The mounting of small pictures, calendars, and labels, with due regard both to the technique of clean mounting and to the position of the article upon the mount. Double and triple mounting to show borders.

3. Edge binding with cloth of ready-cut cards, and later of cards cut to size by the student, for loose-leaf covers, calendar backs, blotters, etc. Surface covering with plain and decorated papers.

4. The further manipulation of cloth in hingeing, cloth covered corners, blotter corners, portfolio flaps, etc.

5. The various methods of "binding" loose-leaf books, *e.g.*, cords, rings, screw-binders. Types of loose-leaf fittings practicable for school use. The use of the

perforating and eyelet punch; the closing of eyelets. The making of various types of loose-leaf books, including albums with "stubs" and other special arrangements for holding mounted pictures, cuttings, stamps, etc.

6. Simple methods of folding sheets to form pages. The meaning of folio, 4to, 8vo, 16mo. Common commercial sizes of paper sheets.

7. The making of single-section "books," from the Christmas card or programme folded folio with stiff paper cover tied with ribbon or cord, to the 16mo notebook or album with board cover, half bound with cloth back and paper covered sides.

8. The making of quarter-bound and half-bound "cases," to be used as looseleaf binders.

9. The recovering by "casing" of a book of which the sewing is intact.

Decorative Processes.—

1. Stick printing of borders, corners, centre-pieces and all-over patterns, in one, two or more colours, using one or more units. (a) Using plain sticks of simple geometrical outline, squares, circles, etc. (b) Using more elaborate units formed by filing or cutting the sticks. (c) Using "lino stamps" on which units of more free but still very simple design are cut by the student. The use of the foregoing in the decoration of finished articles and in the preparation of patterned cover and endpapers.

2. The use of very simple lino cuts for the printing of labels for initials, numbers, monograms, symbols, etc.

3. The decoration of cover and endpapers by the use of paste colour, decorated by brush marks, combing, or dry stamping. The making of stick-printed patterns on a paste-coloured ground.

4. The making and use of very simple stencils in decorating articles produced during the course.

Lettering.—The use of the broad pen in straightforward Roman lettering (upper and

lower cases) applied to the titling of books, the writing of owners' names on articles produced during the course, the lettering of labels, invitations, headings, etc.

GLOSSARY

This glossary does not include all the terms used in bookbinding, but only those likely to be met with in school work.

ALBUMEN.—White of egg, used in gold tooling. May be bought in dried form.

ALL-ALONG.—Style of sewing where a thread runs the whole length of each section. See **TWO-ON**.

BACKING.—The process wherein the backs of the sections are turned to either side of the middle of the back to form shoulders, against which the boards of the book may come to rest (Plate XXIV, Figs. 39-42 and Plate XXV, Fig. 43).

BACKING BOARDS.—The sloping and bevelled boards used in backing (Plate XXV, Figs. 41-43).

BAND NIPPERS.—Nickelled, broad nosed pliers used in straightening the bands and leather into closer contact (Plate XXXVI, Fig. 103).

BANDS.—The raised cords upon which the sections are sewn in flexible binding (Plate XXXV, Fig. 97).

BLIND TOOLING.—Impressions made with the aid of a bone folder, etc., upon a cloth still damp or upon leather (Plate XXX, Fig. 68).

BLOCKING POWDER.—A fine powder (powdered shellac) used to make foil or gold stick to the cover.

BOARD PAPERS.—The sheets of the endpapers, which are finally stuck on to the boards (Plate XXX, Figs. 69 and 70).

BODKIN.—A tapered awl used to make, in the millboard, the holes through which the slips are laced (Plate XXXVII, Fig. 108).

BURNISHER.—A tool of brass, agate, or bloodstone used in burnishing (Plate XXXVIII, Fig. 114).

CASED BOOK.—One, which after sewing, has its slips (tapes or cords) and mull *glued* to the boards of a case (Plate XXX, Figs. 69 and 70).

COLLATING.—Checking the order and arrangement of the sections before sewing.

CORD.—Hempen cord of *long fibre*, used as bands (Plate XXXV, Figs. 97-100 and Plate XXXVI, Fig. 101).

CUTTING BOARDS.—Those placed each side of the book before insertion in the lying press for ploughing of the edges (Plate XXII, Fig. 30).

CUTTING-IN BOARDS.—The boards are attached to the book before the cutting of the edges is carried out (Plate XXXVII, Figs. 109 and 110).

CUTTING PRESS.—The long cheeked timbers wherein the book is tightly screwed for cutting, backing, etc. (Plate V, Fig. 2).

ENDPAPERS.—The papers, plain or ornamental, before and after the book proper and next to the boards.

FILLET.—A handled revolving circle of brass used in putting lines of gold on the cover (Plate XLI, Fig. 132).

FINISHING.—Includes all the processes after **FORWARDING**.

FINISHING PRESS.—Somewhat similar to the cutting press, but with one side specially shaped for the finishing processes (Plate XXXVIII, Fig. 113).

FLEXIBLE BINDING.—Type of sewing wherein the thread goes completely round the cords, resulting in raised bands—used in leather binding (Plate XXXV, Fig. 95).

FOIL.—Preparations, some with celluloid base, of gold and other colours, used in titling. Much more easily handled than gold.

- FOLDER.**—A thin tool of bone, etc., used in several processes (Plate V, Fig. 1).
- FOLIO.**—A sheet folded to make two leaves or four pages (Plate V, Fig. 6).
- FOREEDGE.**—The front edge of a book, section or leaf.
- FORWARDING.**—Includes all the processes, except headbanding, between sewing and finishing.
- GATHERING.**—Picking up the sections of a book from piles on a table.
- GLAIR.**—Beaten-up white of egg, used in (1) in the finishing process to make the gold adhere to the cloth or leather covering; (2) in edge gilding.
- GLUING-UP.**—Applying glue to the back of the book, previous to rounding and backing (Plate XXIII, Fig. 36).
- GOUGE.**—A handled arc, usually of brass, used in putting designs in gold on covers.
- GROOVES.**—The shoulders made on the back of the book in the process of backing.
- HALF BOUND.**—A book, whose back and corners are covered with leather or cloth and whose inlays on the boards are of cloth or paper (Plate XXIX).
- HEAD.**—The top of the sections.
- HEADBAND.**—An ornamental and useful string or band worked at the head and tail of the back—usual only in the best work in leather (Plate XXXVII, Figs. 111 and 112).
- HEADCAP.**—The part of the leather drawn up and over the headbands.
- HINGE.**—The backs of the sections.
- HOPPING.**—Loosely holding the sections, sewn or unsewn, and tapping them on the bench to even the back or head (Plate XXII, Figs. 27 and 28).
- JOINTS.**—1. The space between the boards and the shoulder (Plate XXXIV, Fig. 92).
2. The shoulder made in backing (Plate XXIV, Fig. 41).
3. Pieces of cloth or leather intended to make the endpapers stronger in the hinges.
- KETTLE STITCH.**—The little chain of catch stitching at the head and tail of the back.
- KNOCKING-DOWN IRON.**—A slab of iron used in knocking-out the shoulders on a "pulled" book or in riveting the slips in a flexible binding (Plate V, Figs. 3 and 4).
- LACING-IN.**—The threading of the slips through holes in the millboards (Plate XXXVII, Fig. 108).
- LIBRARY BINDING.**—Split boards (Plate XXXI, Fig. 77); leather cover on back; French joint (Plate XXXIV, Fig. 92).
- LYING PRESS.**—Strong wooden screw press—one side used for ploughing only and the other side for backing or finishing (Plate V, Fig. 2).
- MARBLING.**—The colouring of endpapers or book edges by taking up the oil colours floating on a size solution (Plate XIX, Fig. 12, and Plate VII).
- MARKING-UP.**—Drawing lines across a book indicating the position of the tapes, cords, or saw cuts (Plate V, Fig. 5).
- MILLBOARD.**—A specially strong dark board made from naval cordage, used where strength and durability are a consideration.
- MOROCCO.**—A goatskin leather much used in binding.
- MULL.**—A cloth (muslin) of open texture, glued along and over the back of the book and to the boards—WARP (the stronger thread) *across* the back.
- OCTAVO.**—A sheet so folded that it makes eight leaves.
- OVERCASTING.**—A method of sewing single pages or torn sections.
- PALLET.**—A brass tool used to inscribe lines across a book back (Plate XLI, Fig. 131).
- PARING KNIFE.**—The knife used to thin the edges of the leather (Plate XXXVIII, Fig. 118 and Plate XXXIX, Figs. 119 and 120).

WOOD CUTS AND WOOD ENGRAVING



DESIGN BASED ON THE POPPY

PIN.—An iron lever used to turn the screws of the lying press.

PLOUGH.—A device for holding a double-edged knife in cutting the book edges or millboard.

PULLING.—The taking asunder of a book already bound.

QUARTO.—A sheet folded so as to form 4 pages or 8 leaves.

ROLL.—A brass, revolving disc whose edge has a decorative pattern used in finishing books.

SAWING-IN.—Making of saw lines each side of tapes, under bands or for the kettle stitch (Plate V, Fig. 5).

SECTION.—A folded printed sheet.

SIGNATURE.—The letter, letters, figure, figures, appearing at the bottom of the first page of each section. J, V, and W are omitted.

SLIPS.—The frayed-out bands.

SPLIT BOARDS.—A type of binding where the tapes, etc., are glued *between* two boards (Plate XXX, Fig. 72; Plate XXXI, Figs. 73-78; Plate XXXII, Figs. 79-84; Plate XXXIII, Figs. 85-90; Plate XXXIV, Figs. 91 and 92).

SQUARE.—A projecting part of the boards of a book (Plate XXXII, Fig. 82).

STIFFENER.—The paper strip lining the cloth covering the back of the book (Plate XXVII, Fig. 58).

TAIL.—The end of the book opposite to the head or the bottom of the sections.

TAPE.—The braid on which the books are sewn in some types of binding (Plate XIX, Fig. 9).

TRIMMING.—Cutting the edges of those sections which project most.

TUB.—The stand on which the lying press stands (Plate V, Fig. 2).

TYPE HOLDER.—A device for holding a single line of type (Plate XL, Figs. 129 and 130).

TWO-ON.—A method of sewing where one length of thread attaches two sections to the cords or tapes (Plate XXXIV, Fig. 93).

UNCUT.—If a book is left as sewn, with its edges not ploughed or trimmed, it is said to be uncut.

WEAVERS' KNOT.—The tying usually used in attaching a new length of thread.

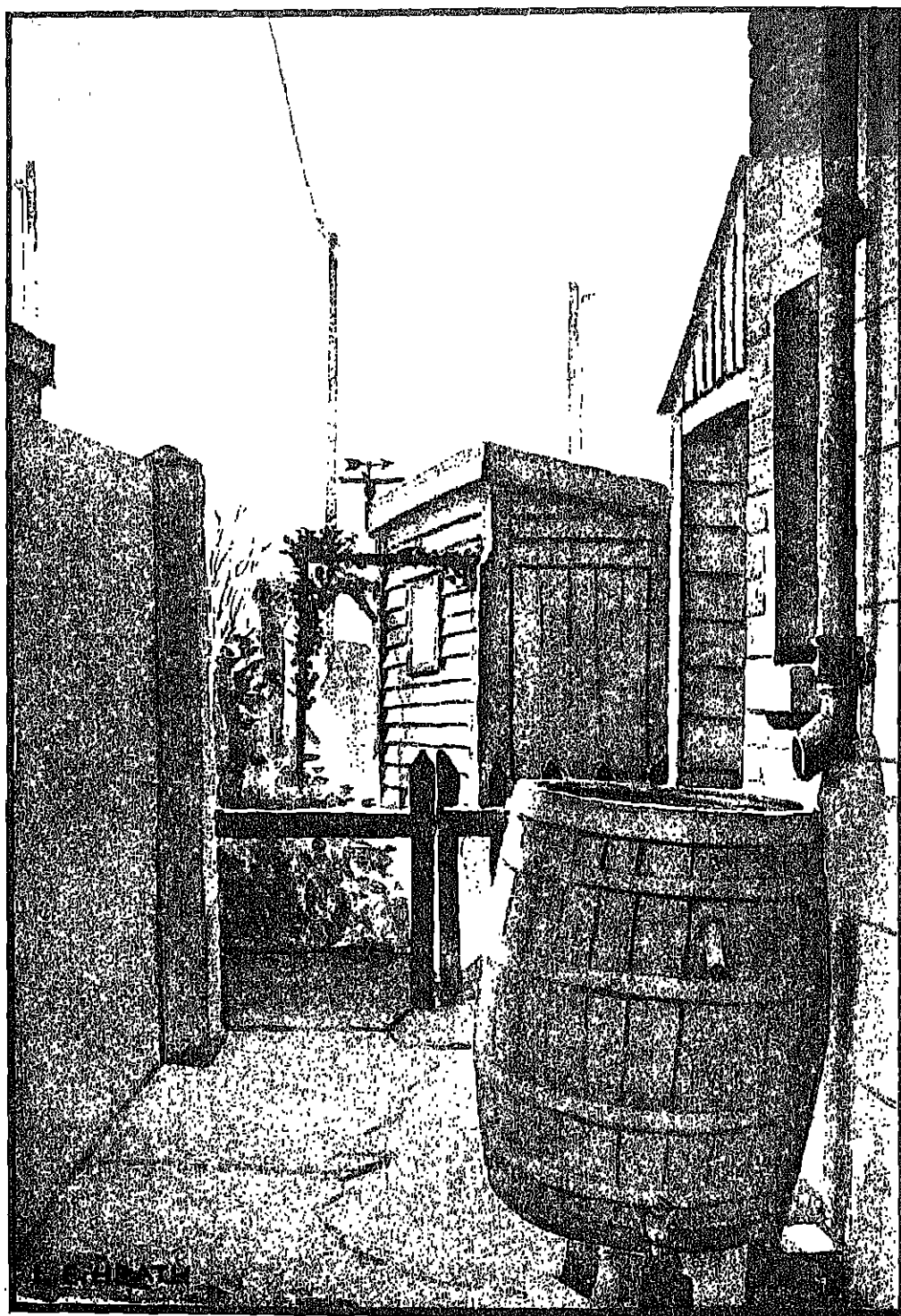
WHOLE BINDING.—Completely covering the back and sides of a book in leather or in cloth—not mixing the two.



SKETCHING OUT OF DOORS

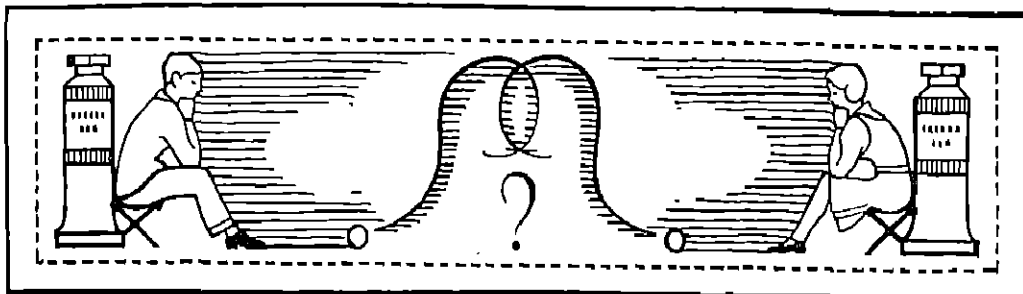
No form of Drawing is so fascinating to Children as Sketching out of Doors It is also one of the very best Personal Hobbies that a Teacher can enjoy.

Sketching Clubs are Valuable Activities in Senior Schools.



BEAUTY IN UNEXPECTED PLACES

I. WHAT IS SKETCHING?



Sketching is the free and entertaining art of recording impressions on paper. There are many different mediums with which to work—pencil, pen and ink, and water colour being the three dealt with in the following chapters. There are also many different ways of approach. This is perhaps one of the chief joys of sketching. It is an individual art. No two persons see the same view in the same way, and in sketching they are not compelled to use either the same materials or the same method of expression.

A mistaken idea entertained by some people is that the only things worth sketching are such pretty things as old thatched cottages. This is quite wrong. Pretty things are all very well, but you can find suitable subjects for sketching wherever you go: that is, if you know how to look for them.

When you go out sketching, keep your mind and eyes wide open. Take notice of anything that appeals to you, even if it happens to be a rubbish heap. It is great fun making sketches of the supposedly ugly things, such as gas works or factories, in order to find out how much hidden beauty they possess. There is no need to go hunting about for well-known beauty spots. If you keep your eyes open for effects of light and shade, interesting groups and colour, you will find how true this is. Beauty is to be found in the most queer and unlikely places. Make a habit of looking for some sort of beauty in all things.

What you sketch does not matter. The subject is unimportant. But it does matter that you should get feeling into your sketch, even if it consists only of a few swiftly drawn lines. Look for, and try to express, impressions. There is no sense in making carefully finished sketches if they lack feeling; photographs would be better and they would save time and trouble! Do see that you get feeling in your sketches. For example, in my possession is a sketch made some time ago of a scene on a marsh. It is not very well drawn and did not take long to do, it is true, but the artist felt and recorded the lonely, misty atmosphere of those marshes and to this day one is impressed with the feeling of loneliness.

Sometimes it will be the colour that impresses you most—the fresh green of spring or the warm grey of town buildings—at other times it may be a windswept sky, the towering majesty of a cliff, or the deep, cool shade beneath some trees. These are some of the things to feel and express in your sketches. Excellent work and technique alone will never make successful sketches.

Some of you are fortunate enough to live in the country, or at the seaside. All around you are to be found subjects for sketching. Your choice is almost unlimited. Others of you live in towns and cities. You will probably think that sketching is out of the question for you. Do not be so pessimistic. Most towns have parks filled with all sorts of

interesting things to sketch, such as trees, lakes, shady paths and tea kiosks. And gardens, even small back-gardens, make good hunting grounds for sketching, if you know how to hunt.

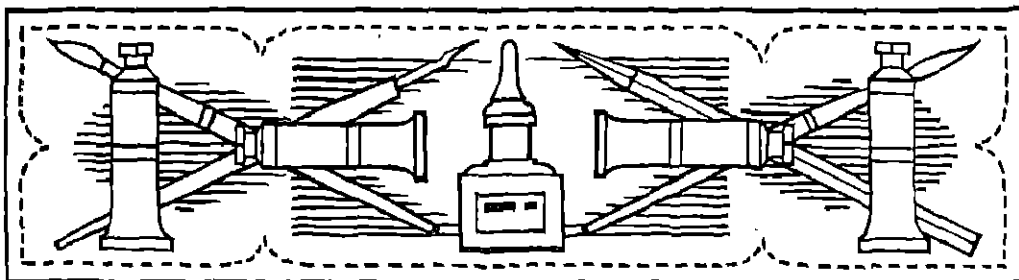
When you are sketching out of doors, it is important that you should be able to work in comfort. For instance, if the sun is shining, you will find it more convenient to sit in a shady place, otherwise, the sun will make a glare on your paper and dry your colours too quickly. If the weather is at all threatening, do not forget to provide yourself with a hat and coat. You will find it more comfortable to have a stool to sit on. It is quite possible to work comfortably under cover in bad weather. Many interesting sketches can be made of views seen

through the open door of a barn or from under a shelter of any kind.

There is always a fine sense of adventure in sketching, due to the unusual places in which you will often find it necessary to work. You need to go out prepared to meet with all sorts of out of the way things, from beauty in unexpected places to sudden showers of rain and boards warning you that "Trespassers will be prosecuted" stuck up in just the very places from which the best sketches can be made.

Before you begin to make sketches it is essential to practice with your materials just as you would learn to use the tools and materials before starting a new craft. The next chapter is concerned with experimenting with pencils, pens and water colours.

II. MATERIALS, PRACTICE WORK AND PERSPECTIVE



The most simple medium to use for sketching is the pencil. Apart from its use as a solo medium, it can be used to put in the faint foundation lines of both pen and water colour sketches. It is capable of producing monochrome shading and lines of varying tones.

The only materials needed for pencil sketching are an H.B. pencil—with a metal cap to protect the point when not in use—and a sketch book of cartridge paper.

Sharpen the pencil to a point (Fig. 1A) and rub it down on a piece of spare paper, Fig. 1B. Use the flat edge of the point for drawing wide lines and shading (Fig. 1C)

and the sharp edge of the point for drawing details and fine lines, Fig. 1D.

Practise holding your sketch book at arm's length, resting on your knees and sloping at an angle of about 45° . It is quite possible that at times you will want to sketch standing. Then you will find it most convenient to hold your sketch book so that it rests in the crook of your arm.

Hold the pencil, not too tightly, so that the end of it rests against the palm of your hand, Fig. 1E. When you are drawing, move your arm freely and from the shoulder.

Now for some practice. First of all, try drawing all kinds of lines in different

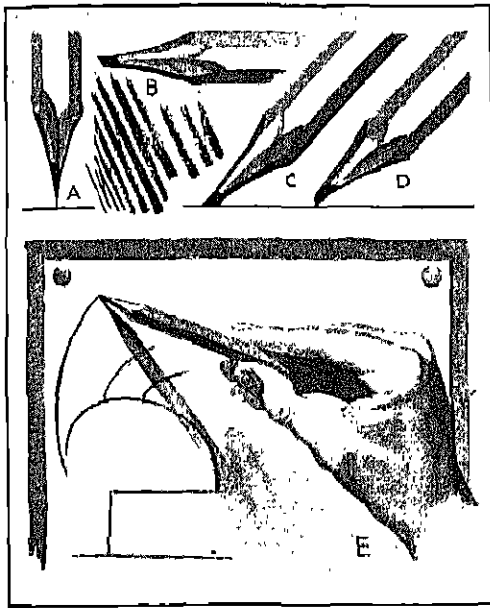


FIG. 1. PREPARING THE PENCIL

- A. Sharpen pencil to point.
- B. Rub pencil down.
- C. Use flat edge of point for shading and wide lines.
- D. Use sharp edge of point for fine lines.
- E. Hold pencil comfortably, work with freedom.

directions; such as lines drawn horizontally, vertically and diagonally, Pl. I. Try drawing them as straight as you can. The vertical lines will need more careful drawing than the horizontal ones. The diagonal lines running down from left to right will not be so easy to draw straight as those running up to the right.

The horizontal lines can be used to emphasise a feeling of rest. These horizontal lines are to be seen on marshlands and flat country and on sheets of water. Vertical lines are suggestive of support and strength as seen in such things as tree-trunks, pillars and the edge lines of towering cliffs.

Then draw another series of lines, trying this time to get feeling into them, such as softness, hardness, unevenness, and waviness, Pl. I. Different kinds of lines such as these can be used to express the edges of objects, like the hard edges of pieces of wood and iron, the broken edges of stone

and brickwork, the soft, fluffy edges of a cloud and the irregular undulating lines of landscape.

It is good practice to draw circular shapes, Pl. I. There are many objects containing circles, or parts of circles and ovals, such as cart wheels, oast houses, window and door heads and water butts. Curves convey a feeling of life and movement, as can be seen in the lines of growing plants and trees and windswept skies.

Next, you can practise making shading of different tones. Draw several squares about an inch in height and width. Fill them with shading built up with vigorously drawn pencil strokes and evenly graduated from light to dark, Pl. IIa. The tones will correspond with the highest lights and darkest shadows likely to be required in a sketch. Do not work over the shading in a laborious manner, but strive to make it as even as possible and crisp. If little flicks of white paper show through occasionally, leave them. They will add life and sparkle to the shading.

Finally, try representing the surface of different objects, such as brick walls, tiled roofs, wooden fences, haystacks, stone walls, and hedges, Pl. IIb. It is important that you should be able to do this. After all, water must look like water, and not like anything else in your sketches. Try to express the difference in texture between such surfaces as those of still water, rough-hewn stone, beach and running water. Do not scribble the textures carelessly, but use vigorous, well-chosen pencil marks. If you can see such objects as roofs, walls and fences through your window, it will be very helpful to study them and make quick pencil notes of them.

When you have found out what you can do with your pencil, it will be a good idea to practise sketching natural objects such as leaves, twigs and flowers. You will be able to make use of your knowledge of line, tone and texture.

Study the objects carefully before beginning to draw. Examine them with half-closed eyes. Try to see them as whole

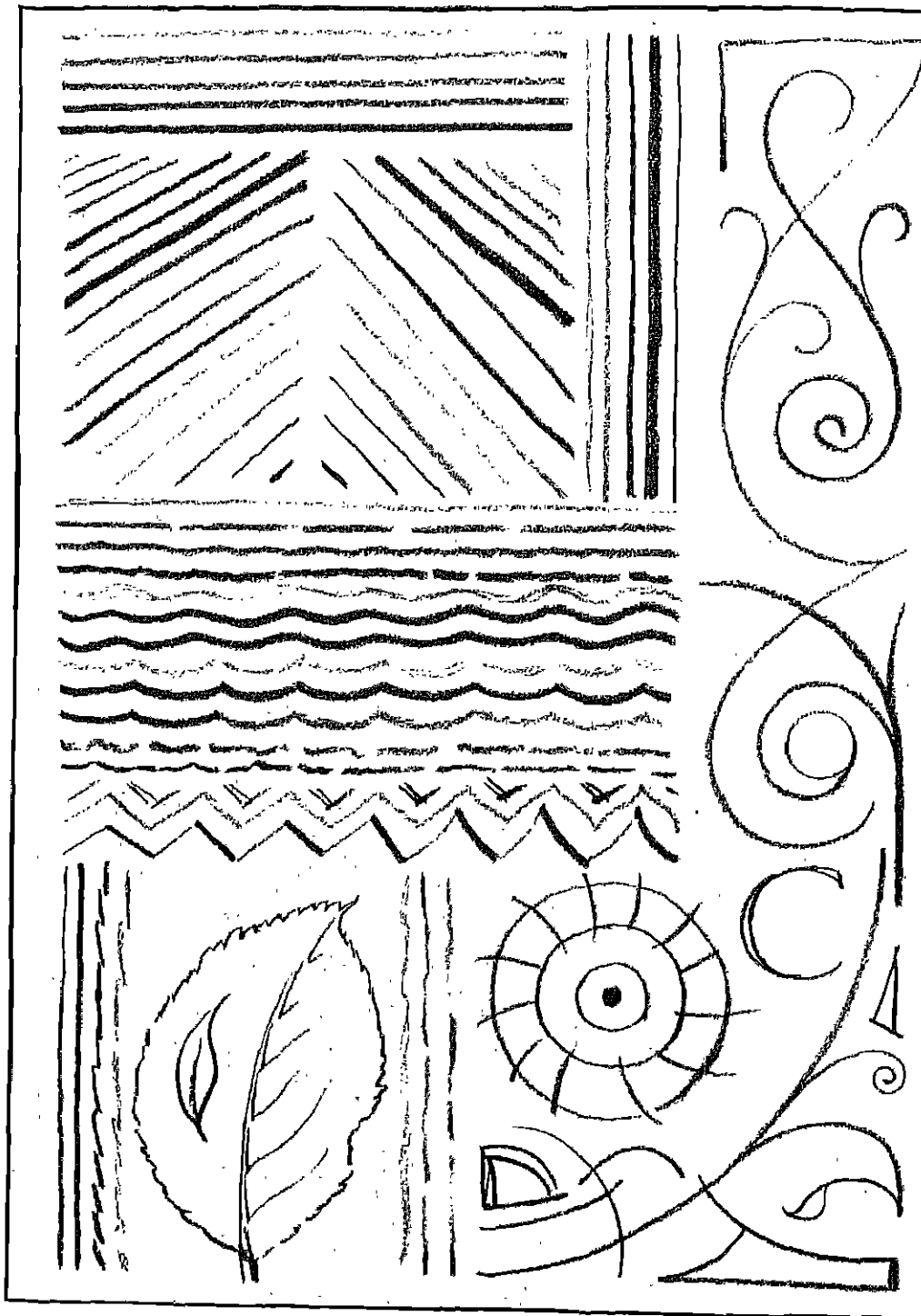


PLATE I

Experimental lines drawn in pencil. Straight lines, irregular lines and curved lines.

shapes. Notice their main lines, the disposition of the tone shapes. If you are sketching a spray of leaves, notice the way in which the leaves spring out from the stem, the characteristic shapes of the leaves and the way in which some of them are foreshortened as they project towards you.

When you have made quite sure of what you have to represent on paper, begin by very lightly suggesting the limits of the coming work by means of hardly-seen pencil marks, such as the highest and lowest points and the greatest width. Next, roughly and faintly put in the main lines and divisions. The shadows must be considered next. Put in the textures to suggest the difference in surface between the roughish stems and smoothish leaves. Use the direction of lines, employed to build up tones and textures, to express the changes in direction of the planes. Finally, very carefully consider the edge-lines. The edge-lines of light masses against dark must be strengthened, while those of dark masses against dark must not be emphasised. It is usually necessary to make near edges stronger than far edges according to their distance from you. On the stems, the edges should be "lost" as much as possible to give a feeling of roundness.

Do not use a rubber! Train yourself to think out carefully what you want to draw, to put it down on paper correctly and then to leave it. Do not get into the habit of drawing things carelessly, putting in wrong or unnecessary lines and murmuring to yourself, "Oh, it does not matter, I can easily rub them out again."

Pen and ink is the next medium to practice with. It is not so easy to control as pencil. At first it is apt to be scratchy in use and care is needed to prevent blots being dropped on the paper, or the wet ink work being smudged. After a little practice you will find that it is a delightful medium to use and is very expressive.

Once the pen line has been put on paper it cannot be erased and this makes it necessary to consider each line carefully before

it is drawn. The lines must be direct and vigorous, no matter how fine they are.

For sketching in pen and ink, you will need the following materials,—a pen fitted with a good quality drawing nib but not a mapping pen; some Indian ink; some paper or card with a smooth, non-absorbent surface, such as Bristol Board; an H.B. pencil with which faintly to rough in the foundation lines of the sketch; a soft rubber with which to erase the pencil lines after the pen work has been completed.

For practice, begin by trying all kinds of lines with the pen, similar to those you made with your pencil. You cannot make the lines lighter in tone as with a pencil, but, by varying the pressure, or by building up the lines, they can be made in differing strengths, Pl. III.

It will not be quite so easy to get feeling in the lines as it was with pencil. The best way to make the lines for such edges as those of clouds is to use little dots and touches of the pen.

Shading in pen and ink is built up of lines. The different tones are produced by placing lines of different thicknesses at certain distances apart. An effect of even tone is obtained by the use of regularity of line-width and spacing. All this needs some little practice, but after a time it will come quite easily. Try to avoid the blotchy effect produced by the lines running together.

Draw several inch squares in pencil and fill them with tones graduating evenly from light into dark, Pl. IVa.

Try making textures with your pen just as you did with your pencil. Try to keep the pen work clean and not all blurred into one mass, Pl. IVb.

When you have become used to the "feel" of the pen, play about with it and make some imaginative sketches, using your knowledge of pen technique, Pl. IVc. Do not spend much time over each one. Simply make a few quick strokes, see what they suggest to you, add a few details, shading and textures and then pass on to the next one. It is fine fun and good practice.

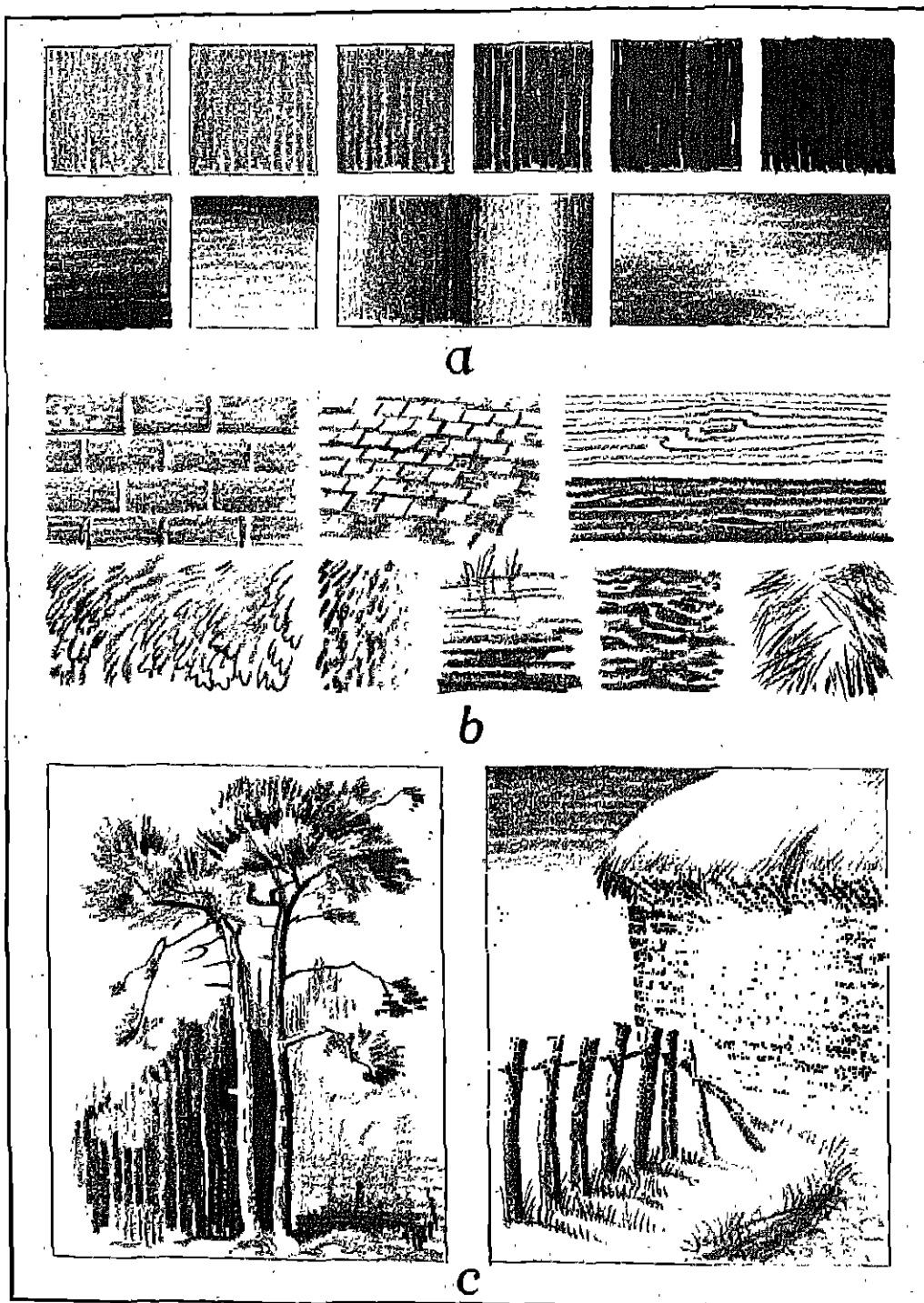


PLATE II

- a. Shadings drawn in pencil.
 b. Textures drawn in pencil. Brickwork, tiling, wood, foliage, rough stone, smooth water, rough ground and hay.
 c. Two experimental pencil sketches.

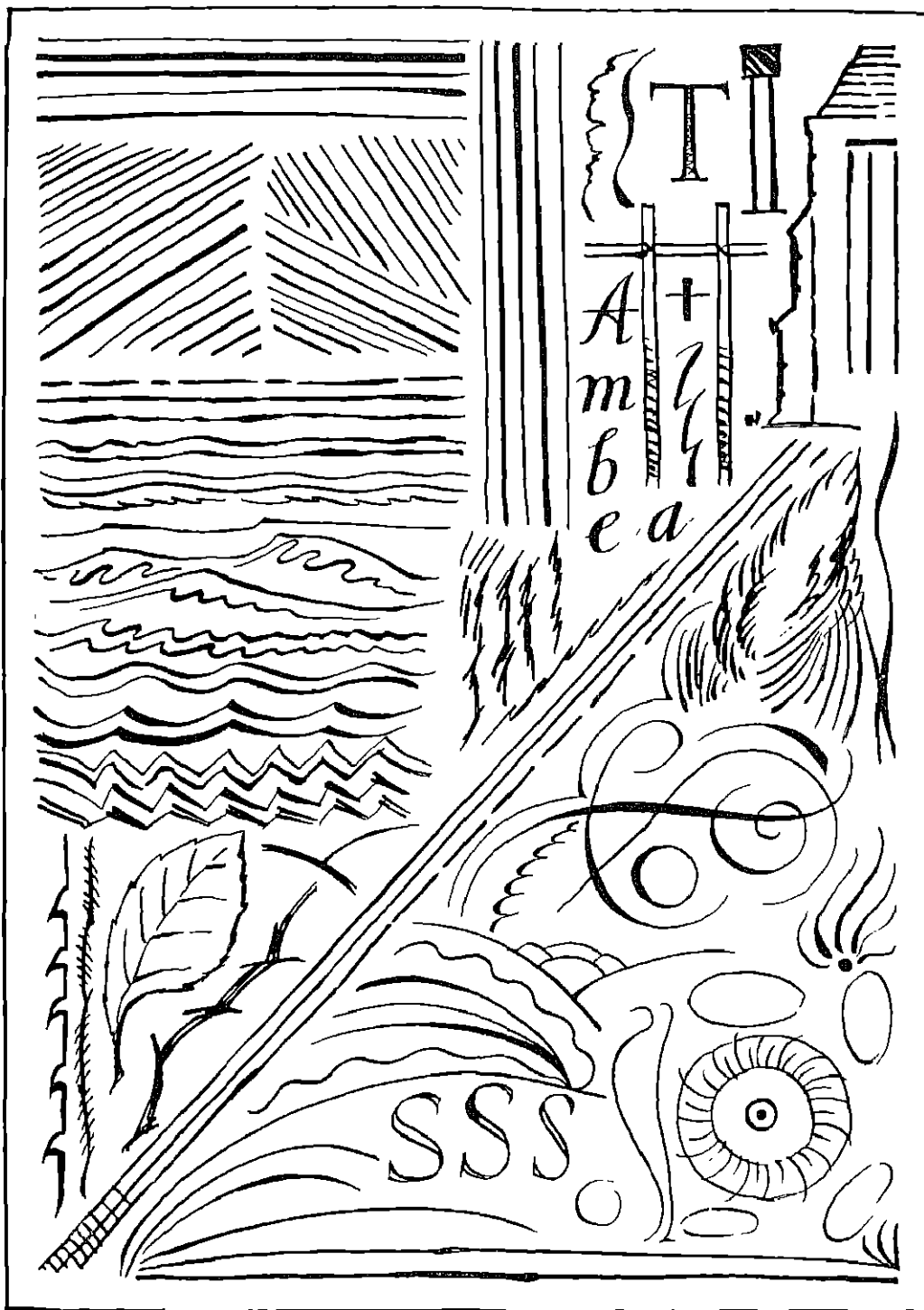


PLATE III

Experimental lines drawn with pen. Straight lines, irregular lines and curved lines.

After practising with your pencil and pen, you will probably be impatient to get on with some colour experiments.

Sketching with water colours is the most satisfying and delightful way of making sketches, because in this way you can attempt to express all that you see in nature, —shape, colour, tone and depth. But it is a most exacting art, requiring much practice and a full knowledge of the materials.

Your urgent need is for a good paper, such as Whatman's "hot-pressed" water colour paper. This can be obtained ready mounted on boards 22 in. by 30 in., but it is less expensive to mount the paper yourself by stretching it on your drawing board. To do this, cut the paper to the required size and soak it thoroughly in clean cold water. Lay it on the drawing board and after sponging off the surplus water, fasten it down round the edges by means of strips of glued paper or gummed tape. Then leave it to dry. Do not use blocks of water colour paper, because the sheets have an unpleasant way of cockling up when damped, making it impossible to lay even washes of colour on them.

You will need at least three red sable hair brushes. It is important to have good quality brushes, but if reasonable care is taken of them, they will last for years. When you choose a brush, dip it in water, then, if when shaken the hairs close together, it may be considered satisfactory. The following sizes are the most useful to have: No. 2 for fine work, No. 5 for general work and No. 10 for laying on broad washes of colour. Never leave the brushes standing in a jar of water, or the tips will be ruined. Your brushes are best kept lying flat in a case, such as one that can be made from a folded sheet of corrugated paper—about 10 in. by 3 in.—bound together by a rubber or elastic band.

The only colours you will need are crimson lake, or ruby madder; gamboge yellow, or aureolin, and ultramarine blue. Use the best quality paints possible and have them in tubes, because the paint in tubes keeps moister than that in pans.

Plenty of clean water is needed. It can be carried in bottles, such as those used for medicine or lemonade. Sometimes, water can be obtained on the spot, but it is better to make sure of a supply by always having some with you. You will require a receptacle of some sort to hold a quantity of water for use while working. Ice-cream tubs make good water holders and there are water cups, or dippers that can be obtained to fit on to the palette by means of clips.

Other necessary items to include in your list of equipments are a sponge, a folding stool and plenty of rag.

An easel is a useful thing to have, although some people prefer to work with the drawing on their knees and, of course, an easel adds to the amount of gear to be carried on a sketching expedition.

A satchel, in which your materials can be carried slung over your shoulders is also a useful thing to have.

So much for the materials needed, and now for some practice in colour work.

Arrange the drawing board and paper sloping at an angle of about 45° in order to allow the colour washes to flow gently down the paper. The colour box and palette are held in your left hand and the water pot is placed to the right of the paper, unless it is fixed to the palette.

Squeeze out a little of each colour on your palette, fill up the water pot, get out your brushes and you are ready to begin.

The three colours on your palette, red, yellow and blue are called primary colours and intermixings of them will supply you with a very wide and sufficient range of other colours. The red mixed with the yellow in different proportions will give you varieties of orange, ranging from reddish yellow through to pure orange and yellowish red. In the same way, yellow mixed with blue will produce varieties of greens, and blue mixed with red will give varieties of purple. These three resulting colours, orange, green and purple are known as secondary colours and can be used to heighten the primary colours by being placed side by

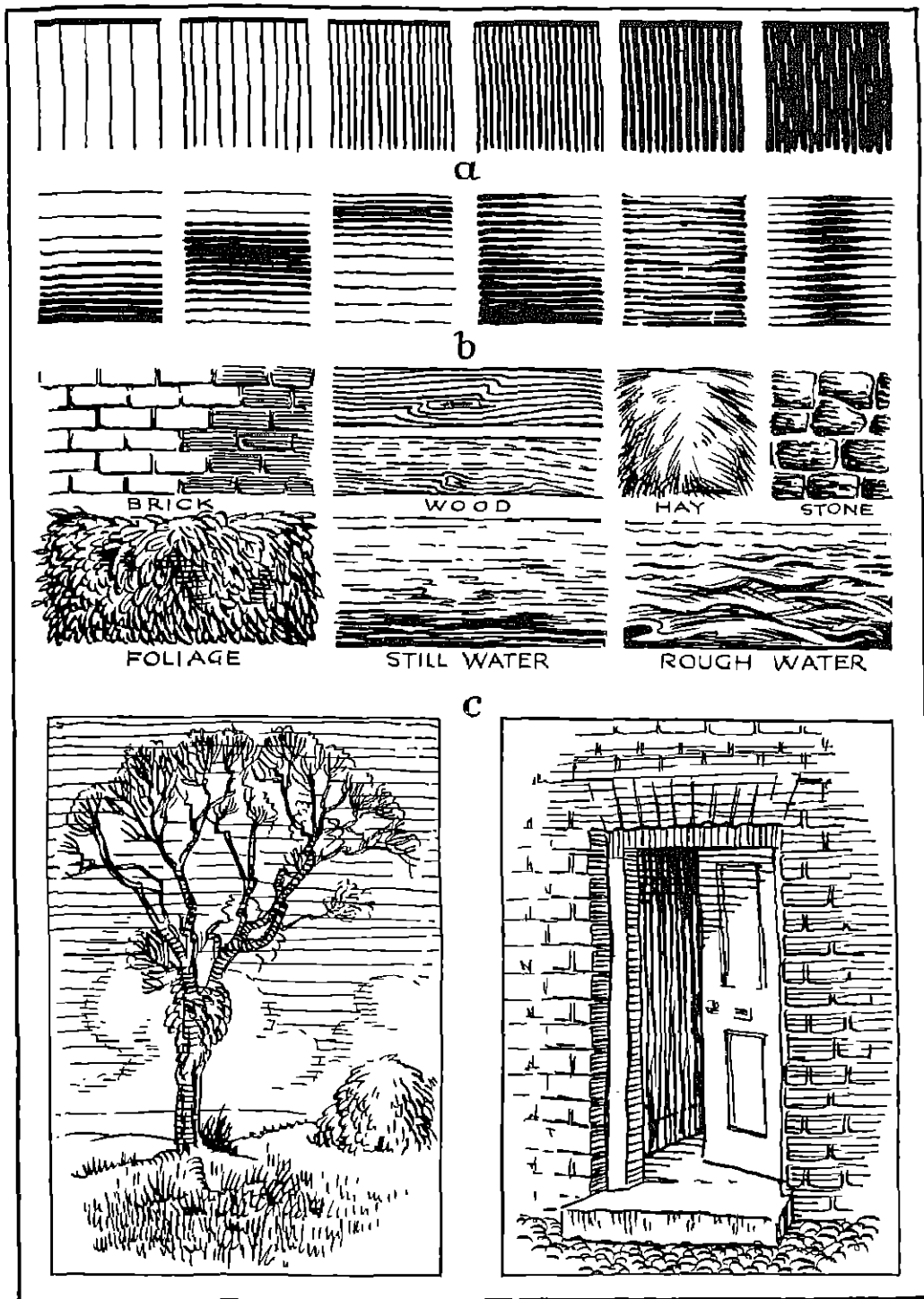


PLATE IV

a. Pen shading.

b. Pen textures.

c. Experimental pen sketches.

side, such as yellow against purple, red against green and blue against orange. These latter are known as complementary colours. In a sketch, a small touch of orange will immediately heighten an area of blue and the same with the other combinations of complementary colours. In a landscape lit by a red sunset, for instance, the shadows will all have a tendency to be green. Great care must be taken so that the colours are not of equal area or the result will be inharmonious.

You must experiment with your colours as much as possible so as to be able to get the utmost value from them.

The colours may be blended by laying them one over the other, by mixing them when still wet or by breaking them through one another in spots.

Before practising blending the colours, try laying the colours on in washes. Damp the paper slightly and sponge off the surplus water as it runs down to the bottom. Fill your large brush—No. 10—with colour and draw it across the top of the paper from left to right. Fill the brush well once more with colour and repeat the process, below and overlapping the first stroke so that the two blend together, Fig. 2. Repeat this rapidly until the paper is covered. The washes should not be less than about 10 in. square. Each colour should be tested, from the faintest wash to the strongest, in a series of progressive washes.

Next, practise laying one wash over another of a different colour, such as yellow over blue, red over blue, and red over yellow. If the under colour is a cold one,

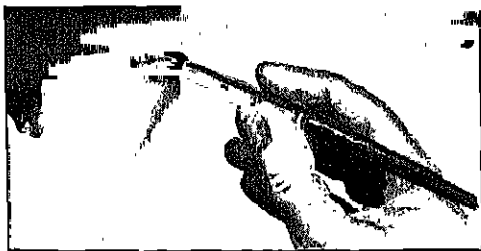


FIG. 2. COLOUR WASHING

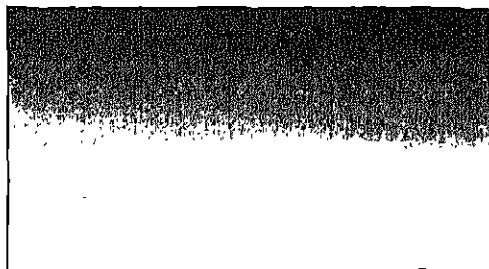


FIG. 3. BLENDING COLOUR

such as blue, the result will be rich. A cold colour, such as blue, washed over a warm colour, such as orange, gives a more grey effect.

Practise producing gradated colours by blending them gradually, one into another, or from dark into light, Fig. 3. Use plenty of water and paint "wet" so as to get a fluid result. An effect, easy to obtain and to be avoided, is one of dryness with hard edges. The beginner in water colour sketching usually makes two mistakes. The first is to use too little water and the second is to use too weak colours. Colours always dry paler and you must learn to make allowance for this. Do not hesitate to use the colours pure and of full strength. The proportion of one colour to another is far more important than the kinds of colour used. At this point it will be a good idea to make some quick colour sketches and try some colour mixtures.

Charge the large brush with full strength blue and draw it across the top of the paper. Proceed as you did when you laid the washes, but add more water for each brush stroke so as to make the colour paler as it comes down. Add a tinge of yellow to the last stroke and bring it down to below half-way across the paper—and there you have a sky. Finish off the picture with a streak of reddish-blue at the bottom, for the earth.

You can make some other interesting sky pictures, such as sunsets and sunrises. These will have red and yellow in them and the earth colour should be dark to add to the glow of the sky.

Next, you can make a picture with a

tree in it, Fig. 4. Paint some blue sky at the top, perhaps with some clouds. While this is wet, paint on a few yellow dabs for the tree. Let them blend with the blue sky to make green. More blue or yellow can be added to vary the green and some red run in for the shadows. The trunk and branches can be put in with red, yellow and blue mixed fairly dry. If you are not satisfied with the results, wash some more colour



FIG. 4. SKETCH IN WATER COLOUR

right over the tree and work into it while it is still wet.

Perhaps the colours will get out of hand. It does not matter—they will suggest some other effect to you, such as a sunset or an autumn scene. Try to make the tree look round and solid, with some of the branches projecting towards you. But this may be difficult at first and will need practice.

You can easily wash out the whole, or part of the sketch, either under the tap or with a sponge.

For another imaginative sketch you can have a haystack in a green field. Whatever the subject may be, strive to get a broad effect and avoid putting in details which will spoil the general impression.

Here are four useful hints for sketching in water colour:

1. Purity, not muddiness of colour.
2. Liquidity, not dryness of colour.
3. Strength, not weakness of colour.
4. General effect, not minute details of drawing.

After you have gained a certain amount of experience in the use of colour, it will be good practice to paint a bunch of flowers. Arrange them in a mass, not separated out.

Look long at the subject and try to see it as a whole. With this object in view, it is best to look at the subject with the eyes half-closed. This will blur out all the details and allow only the large masses to be seen.

When you have considered the subject well and know what you must put on paper, you will probably wonder where to begin.

Begin with the background. Run it on, taking it right over the bunch of flowers and leaving only those parts that are lighter than the background. Next, while the background is still wet, work in the flowers, using slightly drier colour round the edges and putting in first the light and then the dark colours. Flood the colours on, allowing them to mix on the paper, painting one over the other. Work always from left to right and from top to bottom. Take great care not to let the paper dry anywhere. Keep your painting wet and fluid, using dried colour for sharper edges. Some skill is required to know when the paper is just damp enough; it must not be soaking, but it must be wet enough to prevent a hard edge from forming.

Take great care to get the colours right, testing their strength from time to time on an odd piece of paper.

You will notice that there are no absolutely flat colours in nature. Even areas of colour that are known to be flat, such as the paint-work of doors and other objects, appear to

be gradated, being affected by shade and reflected light. For example, in a blue vase the colour is gradated by its roundness until it meets the shaded side, which in its turn is gradated by reflected light. Take as another example a blue sky. At first sight, this may appear as a flat blue, but on examination you will find that it is gradated from the highest point, through dark to light in the direction of the sun, where it will be mellowed with yellow.

Compare your work with the subject frequently. Place it beside the model and view the two from a distance. Look at them with eyes half closed. Most likely it will be lacking in broad effect and tone, and with too prominent details.

It is always possible to wash out and flood on fresh colour, but do not labour over the work. In any case, avoid a muddy, overworked, too dry effect. Do not despair of a sketch if it is unsatisfactory after the first painting, yet do not work tiringly over one if the surface of the paper begins to show signs of being stirred up.

There are two things to be careful about in water colour sketching: (1) the way in which all edges, except very sharp ones disappear (half close your eyes and you will observe how few really sharp edges there are) and (2) the contrast of the shadow lines. Practice will teach you to judge just when the paper is damp enough to produce the required softness of the edges. Sharper edge contrasts can be obtained by the use of drier paint, Fig. 5.

The brush can be used very wet, or

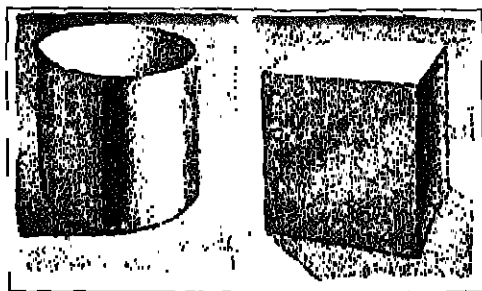


FIG. 5. SOFT AND SHARP EDGES

nearly dry—never absolutely dry. Practise painting textures to represent cloth, glass, wood and stone.

Now in order to be able to draw objects truthfully, you must know that your eyes are continually playing tricks with you with regard to the shape and size of what they see. You will have noticed that objects such as telegraph poles, uniform in height and spacing apart, appear to grow shorter and closer together as they recede into the distance. In a similar way, railway lines, necessarily the same distance apart all the way along their length, appear to draw nearer to one another as they recede from you. These optical illusions, of which we take little or no notice in everyday life, set some problems to be solved when they are to be recorded on paper.

To be able to record the illusion of distance on paper it is necessary to know something about the general principles of perspective, the science that deals with the representation of distance on a flat surface.

The calculation of perspective in a sketch is based on the fact that the horizon appears to be on a level with your eyes. This line, the eye level, is not always visible, being sometimes obscured by objects on rising

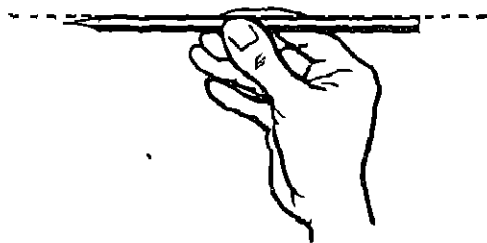


FIG. 6. FINDING THE EYE LEVEL

ground. It can be ascertained by looking straight ahead and holding your pencil in front of you at arm's length on a level with your eyes, Fig. 6. Notice where its upper edge cuts the surroundings and these places can be very faintly suggested at the edges of your sketch for reference.

Another line taken into account by the practice of perspective is the line of vision,

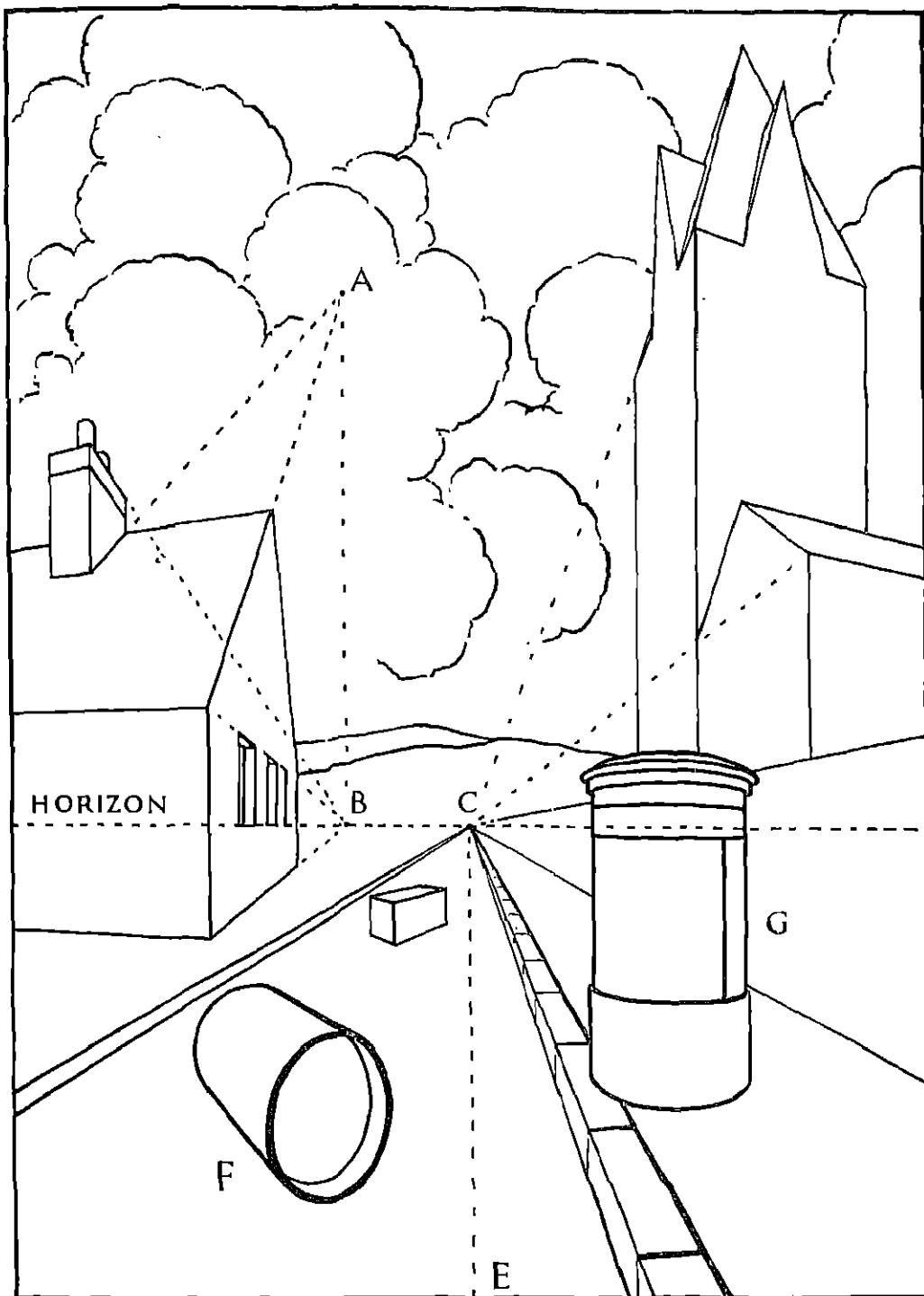


PLATE V. PERSPECTIVE DIAGRAM

A. Vanishing point. D. Vanishing point on the horizon. C. Point of vision.
 C-E. Line of vision. F. and G. Circular objects in perspective.

Pl. V C-E. This is an imaginary line running straight ahead from your eyes to a point on the horizon called the point of vision, Pl. V C.

Perspective is a very complicated science but it is necessary to understand only the general principles of it. Here are four of the rules of perspective that will help you to get good drawing into your sketches:

1. All parallel lines, except those that run across your line of vision from left to right, meet at a point called a vanishing point, Pl. V A.

2. Horizontal lines, except those that run across your eyes from left to right, converge to points on the horizon, Pl. V B.

3. Horizontal lines parallel to your line of vision converge to the horizon at the point of vision, Pl. V C.

4. Circular objects, such as wheels, windows and door-heads, when turned horizontally, or vertically away from you, appear as ellipses. The more a circular object is turned to the right or left, the less curved it will appear. The more a circular object is seen above, or below the horizon, the more curved will it appear, Pl. V F and G.

Thus, you have gained some knowledge of the different mediums and how to record what you see on paper. You still have to discover how to capture something of the changing moods of nature. Therefore, the next chapters will deal with some of the problems you will meet with when sketching out of doors.

Teaching hints.—This chapter has been concerned with acquiring the "feel" of the three mediums; pencil, pen and water colour, previous to their use for sketching out of doors; and simple perspective.

The children will have had some experience of drawing and colour work, probably in the form of object drawing. That is a more or less inanimate art and although necessary in art training, can be deadly dull.

Sketching out of doors opens up a new

avenue of thought in subject and expression, namely, that of movement. Movement and life is found in wind-blown trees, animals, water and all the rhythmic lines of nature. The tones and shadows are for ever on the move. The colour, too, is full of movement with its liveliness and the feeling of change, from spring's fresh yellow-greens through summer's ripening greens to the mellow browns of autumn.

The eye must be quick to seize these fleeting things and broad to see the vision as a whole.

There must be mastery over the mediums with which to record these lovely things. Some of this mastery will come only with the actual experience of sketching, such as the representation of atmospheres and colours, but confidence in the use of the mediums, an understanding of their characteristics, limitations and technique can and should be obtained previously in the form of practice work.

The three mediums have and will be regarded as stages: firstly, pencil expressing tone; secondly, pen expressing outline, and thirdly, water colour expressing colour.

In the quick imaginative sketches, the children should be given a free choice of subject and expression. The teacher can offer suggestions as aids to the use and appreciation of good shape, colour and arrangement. The sketches must be spontaneous and not elaborate.

From the beginning, sketching must be treated as an individual art, consisting as it does of individual perception and expression. There must never be any preference for any one subject, medium or method of approach. Liberty is the sketcher's byword. There is no section of this art in which one can definitely say that this is wrong and that is right, unless it be drawing. All the English masters of this art followed their own methods. Cox, Cotman, Crome, Girtin and Turner each had a personal method of approach, technique and style. The methods given in these chapters should be regarded as hints and suggestions.

If possible, show good examples of sketches to demonstrate composition, the use of certain colours and their effects and to show how the old masters painted certain objects, such as trees and clouds. But never permit copies of them to be made. Style must be allowed to develop from individual experience, not by copying the work of others.

With regard to materials, the best quality possible is the cheapest in the long run. Good results cannot be expected if inferior materials are used. Cheap pencils are gritty; cheap brushes moult quickly and lose their points after a little use; cheap paints have too much glycerine in them and do not mix well; poor paper soon loses its working surface.

Paper is the most important item for sketching:—cartridge paper for pencil and pen; banknote paper, smooth cartridge or Bristol Board for pen work; fourpenny cartridge or Whatman's "hot-pressed" water colour paper for painting.

Sketch books of cartridge paper can be

made by the children as part of their book-binding exercises. An imperial sized sheet (22 in. by 30 in.) should be divided into quarters. Each quarter sheet should be folded the short way to form the leaves of the book,—roughly 11 in. by 7½ in., Fig. 7A. The covers should be made of stiff board to give support when working. A wide rubber or elastic band should be provided to keep the leaves from blowing about when in use, Fig. 7B.

It is sometimes difficult to decide which is the right working side of drawing papers. The working side of cartridge paper is the one having an uneven, slightly elongated texture. It is easy to find the correct working side of water colour paper. By holding the sheet of paper up to the light one can see the water mark. The side on which this is seen to be the right way round is the right one.

Insist on the children holding their pencils in the correct manner. They are so often "clutched" in a way that restricts freedom of movement and tires the fingers.

Mapping pens are not suitable for sketching. They are too fine and do not permit the production of a "juicy" line. The most satisfactory nib is a steel drawing nib, such as Gillott's *Magnum Quill Pen*, No. 601 EF. This gives a lovely fluid line capable of any amount of expression.

Advanced students can use a quill, or a reed pen sharpened to a reasonable point. The same students can use inks other than Indian ink. Indian ink is best for beginners, but there is no reason why brown ink should not be used, such as sepia or Prout's brown. These give the sketches beautiful, mellow qualities.

The artist's quality water colours are undoubtedly the best, but the student's threepenny tubes are a good substitute. Occasionally the cap of a tube sticks and cannot be removed. This can be remedied by heating the cap slightly in a match flame. After it has cooled off a little, the cap can be easily unscrewed.

A good and inexpensive substitute for

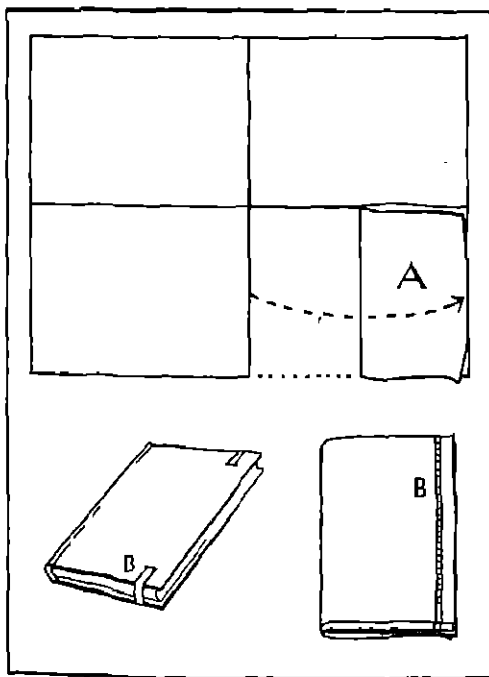


FIG. 7. MAKING A SKETCH BOOK

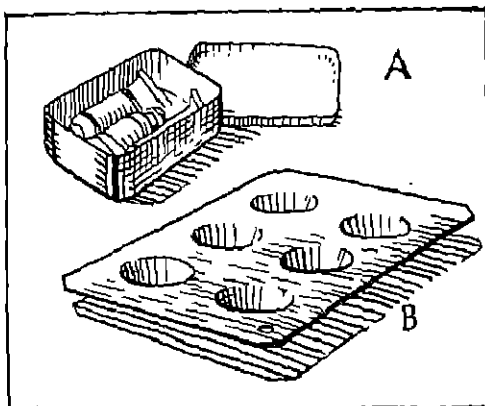
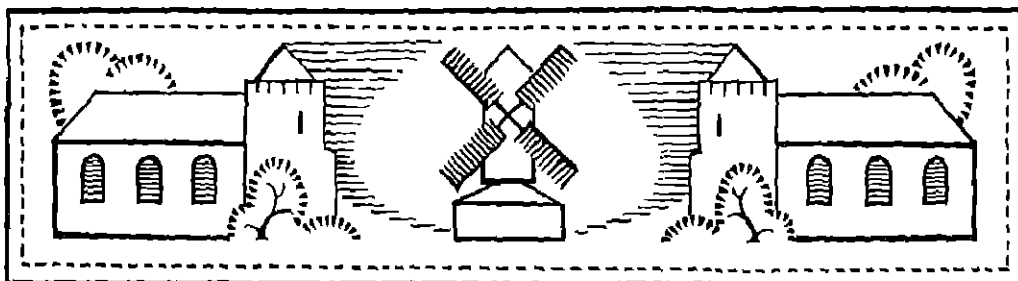


FIG. 8. AN INEXPENSIVE SUBSTITUTE FOR COLOUR BOX AND PALETTE

colour box and palette is a small tin (Fig. 8A), such as an Oxo tin to hold the paint tubes and a tin bun tray on which to mix the colours. The deep sections in which the buns are cooked make excellent places in which to mix up good supplies of wash mixture, Fig. 8B. Special ones, white enamelled ready for artists' use, can be obtained at some art dealers.

Although white paper is generally used for water colour sketching there are also several tinted papers suitable for wash drawings. These can be used by advanced students. There is one known as David Cox paper and a blue-grey paper that was used by Turner.

III. SKETCHES IN THE COUNTRY



If you live in the country, or are going there to sketch, you will find yourself surrounded by a host of beautiful subjects. You will not need to go further than just down to the village or up the lane, as the case may be.

Let us consider some of the more difficult things you will be likely to sketch, such as buildings, trees and animals. Bring your sketching materials and amble down to the farm at the corner of the lane.

Wait a moment! That small cottage over there! That will make a good subject for your first sketch. It is rather old and looks lovely. It might be miles away from the noisy traffic on the main road running behind it.

The sun is shining over your left shoulder and the light and shade is interesting, Fig. 9A. It is best not to work facing the sun, because in that position the subject is seen in shadow and the sun's glare tires the eyes, Fig. 9C. It is as bad when the sun is behind, for then the subject is void of any shadow and the sun shines directly on the paper, making your eyes ache and drying the colours too quickly, if you are painting, Fig. 9B.

You are going to sketch the cottage. Well, that is just what happens when sketching. You choose a suitable place to go to sketch, but on the way some other subject is seen and sketched instead. You can never tell what you are going to sketch until you see

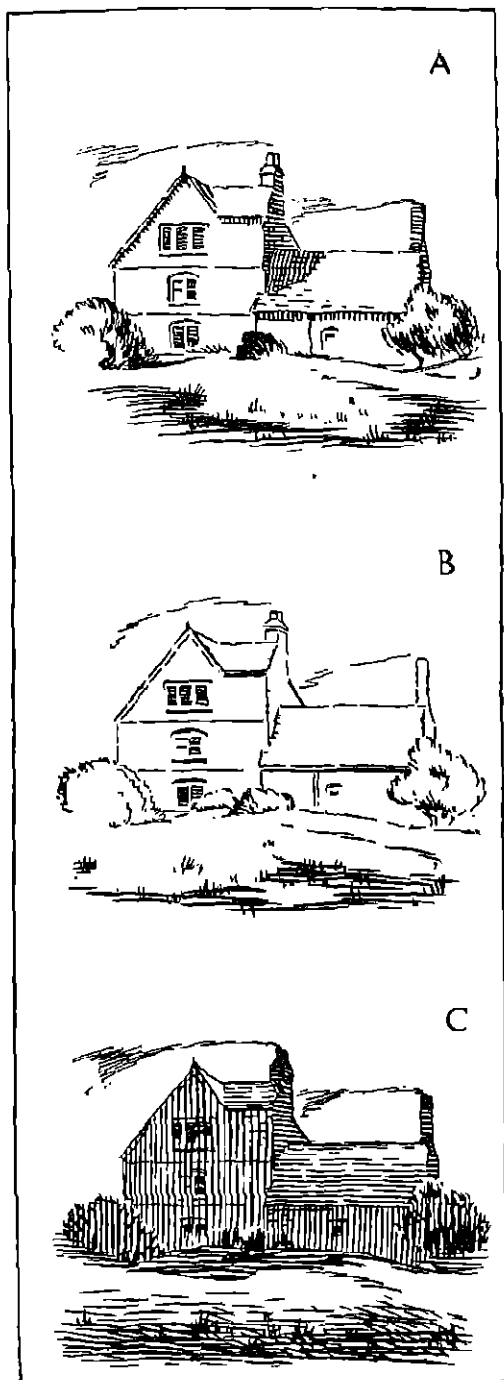


FIG. 9. POSITIONS OF THE SUN

- A. Best position—sun shining over left shoulder.
 B. Sun shining from behind spectator.
 C. Worst position—sun shining directly in front of spectator.

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it. In another light, or on another occasion, you would possibly pass it by unnoticed.

Where shall you sit? Find a dry, safe spot. If the sun is shining very brightly, choose a shady spot. Never sketch in a road or lane unless there is a footpath—and that must not be obstructed. Watch out for notice boards bearing the words "Private" or "Trespassers will be prosecuted." Usually farmers do not object to your presence if you do not damage their property and if you shut gates behind you.

Open up your sketch book, sit down and get your pencil ready because the first sketch is to be drawn in that medium.

Look long and well at the cottage. See it as a whole and half close your eyes so as to see it in a blur that will lose the small details. Fix the subject well in your mind.

It is a common fault with beginners to want to look too much at their drawing and not enough at the subject. Experienced sketchers keep their eyes almost continually on their subject, hardly bothering to look at the paper.

Begin your sketch by very faintly roughing in the limits of the cottage: the height, depth and greatest width. This will form a sort of ghostly foundation (Fig. 10A) on which to base your drawing. It does not matter whether you are using pencil, pen or water colour, your sketch must begin *faint* and work up gradually to the darkest parts. Decide on the nearest corner and check the proportions of the submasses from this, such as the walls, the roof, the chimney, the windows and the door. Measure the proportions thus. Hold your pencil at arm's length, with one eye closed. Mark off the distance to be measured along the pencil with your thumb nail, Fig. 11. Notice how the lines of the roof, the window heads and ledges, door head and step, and the ground run up, or down to the horizon according to whether they are above or below your eye level.

When your sketch begins to show form, with proportion and perspective, hold it out at arm's length and compare it with the

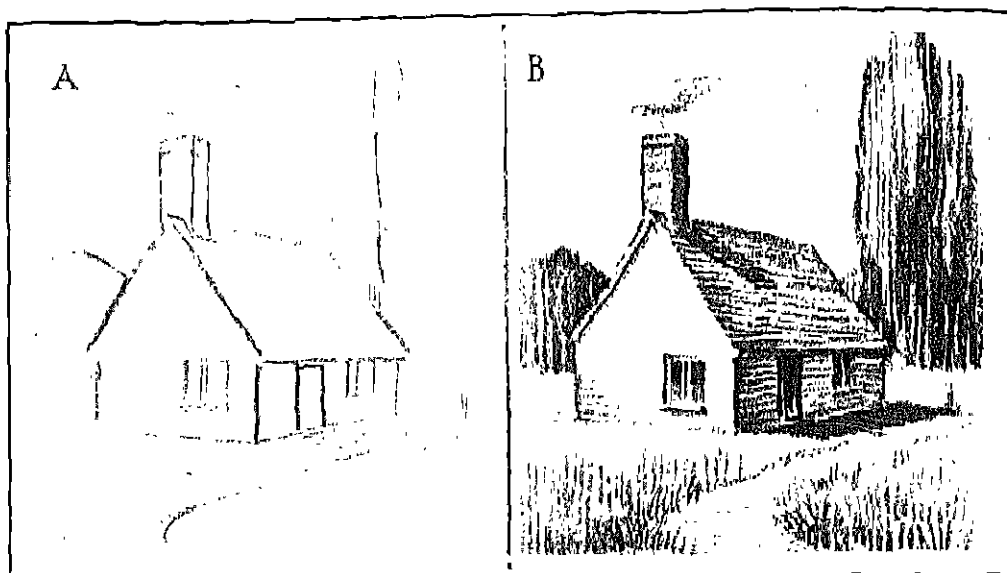


FIG. 10. SKETCHING A COTTAGE

A. Ghostly foundation of pencil sketch.

B. Finished pencil sketch.

actual subject. This will reveal the weak points of the drawing so that they can be corrected while the sketch is in a more or less vague state.

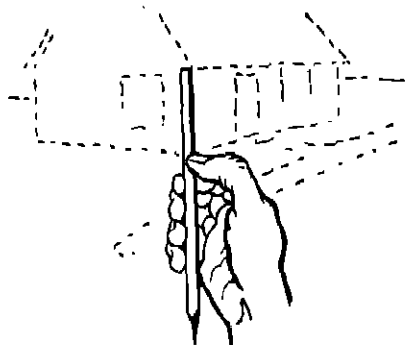


FIG. 11. MEASURING PROPORTION

Next, put in the shadows. Note where the deepest shadow and the highest light falls. Keep these in mind as no other part must be as dark as the darkest shadow, or as light as the highest light. Notice and draw, as correctly as you can, the shadows thrown by the chimney stack on the roof and by the house on the ground. You will need to be quick when you are putting in

the shadows. They change rapidly, especially on a bright, sunny day. Use the nature of your pencil strokes to indicate the directions of the surfaces, or planes. Draw each stroke vigorously and try to give it its full value of tone the first time. Aim at making your sketches spontaneously, do not give your sketch a tired look by working over it too much, Fig. 10B.

This is the art of sketching in pencil, pen or water colour; thoroughly examine the subject before you; register any feelings it gives you; fix it in your mind so that you are *fully* acquainted with it as a *whole*, and then in as simple, truthful and vigorous manner as you can, sketch it in. Do not allow the medium to run away with you; make everything subservient to the subject and put too little into your sketch rather than too much. Often it is the omitted line that tells the story. There is something very much like optical indigestion caused through seeing too much detail in a picture.

Watch out for the textures: the tiled roof, the rough brick work of the walls. Put in sufficient foreground to show that the

cottage is built on something firm and is not floating about in the air. If there is a path leading up to the door, put it in as this will lead the eye in to the centre of interest—in this case, the door.

Do not forget to keep referring to the subject. Frequently hold your sketch up and compare it with the subject.

Keep the sketch moving as a whole, just as you try to see the subject as a whole. Do not concentrate on the single things, such as doors and windows. Try to see the cottage as a solid shape with planes, lying in certain directions—the walls and roof—having light and shade. Keep the details, such as windows and doors subservient to the planes on which they lie.

You will find it best to put most contrast and texture in the parts nearest to you. The nearest corner should be the most decided part of the drawing and those parts farther away less emphasised. Actually, the foreground should contain most detail and it is certainly always best to insist on a

sense of flatness and perspective in the drawing of it so as to give a correct feeling of the ground on which the cottage—or tree, etc.—is standing. A path, apart from helping to lead the eye in to the picture, will give a feeling of perspective by the mere converging together of its edge lines. In the same way, tufts of grass and ground lines drawn in correct perspective—growing smaller in size as the distance increases—will also give the required feeling of flatness and approach. The amount of foreground seen and needed in a sketch is controlled by your position. If you are sitting near the ground you will see less foreground than if you are standing. Thus, very little foreground in your sketch will give a feeling of flatness (Fig. 12) as seen on marshes, while, on the other hand, much foreground will give a feeling of looking down on the subject and hilliness, Fig. 13.

Beware of putting too much texture on the surfaces lit by the highest light. If there is very much bright sun, it will be



FIG. 12. LITTLE FOREGROUND GIVING SENSE OF FLATNESS—LOW HORIZON



FIG. 13. MUCH FOREGROUND GIVING SENSE OF LOOKING DOWN ON SUBJECT—HIGH HORIZON

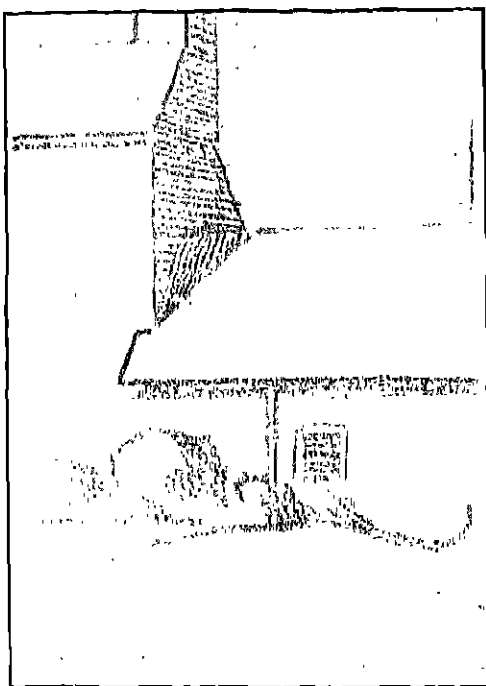


FIG. 14. PENCIL FOUNDATION OF PEN SKETCH

best to keep the lightest surfaces quite free from textures.

When, at last you are satisfied that you have done your best, compare the sketch once more with the subject and give it a final criticism. Ask yourself the following questions. Does the nearest corner really look nearer to you than the rest of the cottage? Is the dark side dark enough? Is there enough contrast along the shadow edges? Does the cottage look too flat through lack of contrast? And so the criticism advances, encouraging a keener observation and appreciation of what is seen.

The next house you sketch will be done in pen and ink. Your foundation work must be similar and just as correct as for the pencil sketch.

Look long and carefully at the subject. Begin by very faintly roughing in the limits of the whole mass shape. Then build up the sketch, giving it correct proportions and perspective. Plan out the positions and

shapes of the window, and chimney. Pay great attention to getting the drawing correct. Suggest the positions of the shadows and their limits, Fig. 14.

When you are satisfied that there is sufficient foundation work on which to base the pen drawing, hold the sketch at arm's length, compare it with the original and make any necessary corrections. Get into the habit of doing this continually all the way through a sketch.

Now, remember to consider each pen line carefully as there can be no erasing once the line is put on paper. Begin with the faint parts so that, if necessary, any alterations can be made as the sketch progresses. Draw in the shadows so as to give form to the sketch. Express the direction of the surfaces by the nature of your pen lines. Try to express edges by contrasts of tone, not by lines.

See how much you can express with as few and explicit lines possible. Aim at

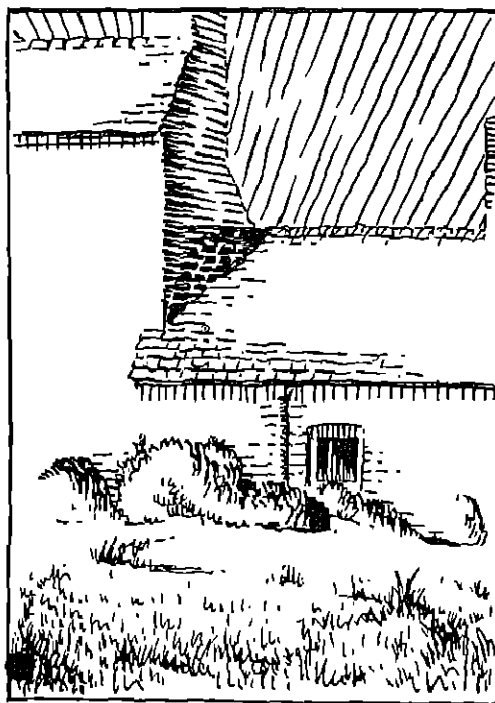


FIG. 15. FINISHED PEN SKETCH

representing the subject in a few, well-chosen lines with broad masses of light and shade. Avoid spottiness and give a feeling of unity to the whole subject.

When you have completed the pen drawing (Fig. 15) the pencil guide lines can be rubbed out. After this the sketch will look very clean and some of the tones will possibly require strengthening.

Compare the sketch with the original at arm's length and criticise it. Are the dark tones dark enough? Is there enough contrast of light and dark? Have you expressed the character of the subject? Do any of the lines need softening by short cross strokes?

When next you make a sketch of a house, use water colour as the medium. So bring along your water colours, paper and other necessities.

Choose a nice, simple subject and settle down in a comfortable position. Then to work. Your first concern will be to find out how much of the surroundings to include in your sketch. A water colour sketch needs some background. But what amount of background? How much sky? How much foreground? How much to the left, or right, shall you place the cottage? Experts know how much to include and where to place objects in their sketches from experience. Beginners will find it helpful to use a view finder. This can be made by cutting a rectangular hole, about 2 in. by 1½ in. in a postcard (Fig. 16A) or similar sized piece of card. The subject is viewed through this hole. By holding the view finder close to the eye you see a large portion of the surroundings, or by holding it at a distance from the eye, you see less. The size and shape of the hole can be changed by using the cut-out piece as a mask, Fig. 16B.

The view finder may be held so as to give an upright, or a long picture. Note how much of the surroundings you are going to include and fix the arrangement in your mind. Study the subject carefully. Half close your eyes and try to see it as a pattern of broad masses of tone and colour. Try to feel the solidity of these masses.

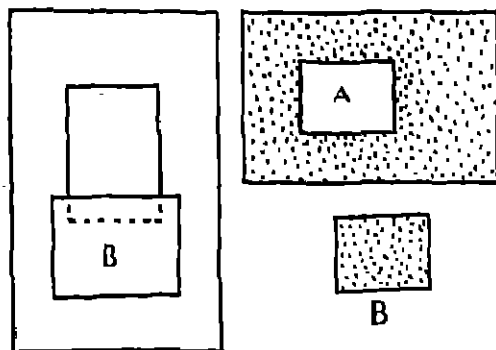


FIG. 16. MAKING A VIEW FINDER

A. Postcard with hole cut in it.
B. Cut out piece of card used as a mask to alter size of opening.

When you have convinced yourself that you know the subject well enough, begin to sketch. Very faintly rough in the mass-shapes with pencil, Pl. VII A. Do not draw at all heavily, or the lines will show through the colour and ruin the sketch. The foundation work should be quite correct, but ghostly, just enough to act as a guide to the drawing. Take great care to get the perspective right and do not be too impatient to begin using the colours. Correct drawing is as important, if not more important, than colour.

Next, damp the paper slightly all over if the weather is hot, so as to make the surface more workable. In hot weather the sun makes the colour dry quickly, that is why it is best to work in a shady position. In cool weather this is not so important.

Begin your sketch by laying on the sky, keeping it wet and running it down paler and slightly more yellow as it nears the horizon, Pl. VII B. Do not attempt any elaborate cloud formations. It will be best to keep the sky an evenly gradating wash until you have had some practice in painting clouds.

While the sky is damp—practice will show just how damp—lay on any distance that shows (Pl. VII B) so that the edges will be lost. Blue gives an impression of distance. The increasing density of the atmosphere adds to the blueness of the distance as it recedes towards the horizon.

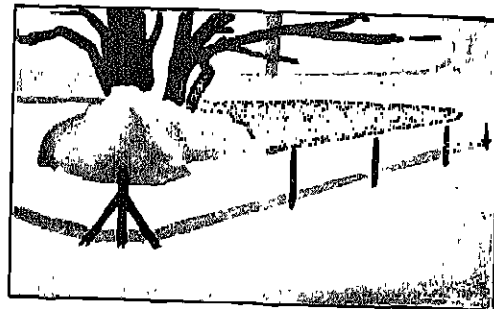


PLATE VI
 USING THE VIEW FINDER. THREE SEPARATE LITTLE PICTURES OBTAINED FROM THE SAME SPOT

Next, while the sky is still damp, lay on the masses of colour on the cottage (Pl. VIII A) as quickly and as carefully as you can. Start at the top and work down the paper. In water colour sketching, always work in layers of distance, from the farthest to the nearest, and from the top to the bottom of the paper. In this way you will not need to work above wet work and the colour will find its way down the paper in a natural way.

Never allow the colours to dry on the paper, or hard edges will be the result. From first to last the sketch must be worked *wet*, drier colour being added to wet colour, so building up the sketch. If wet colour is added to wet colour, it will run and make a blob.

Do not be afraid to use your colours pure and allow them to mix on the paper, breaking them one into another. Use plenty of water, so that the colours flow easily. When they are wet, the colours are movable, but once they begin to dry, hard lines form and nothing but washing out and beginning again will give the necessary fresh, fluid look to your sketch.

Flood on some colour for the foreground (Pl. VIII A), gradating it slightly from pale to dark as it comes toward you, so as to give an impression of the ground plane running into the distance. Keep the ground as unbroken in treatment as possible, even if there is a break in colour. Some few touches, to indicate grass tufts or directional lines, are permissible but on the whole the ground is best kept flat in tone, and very quiet nearest to you along the picture edge.

Next lay on the shades, or masses of shadow (Pl. VIII B) beginning with the palest and working up to the darkest. Carefully observe their tones and limits. Notice the amount of contrast along the shadow lines. Note, also, how the shadow lines follow the directions of the planes on which they lie.

Look continually at the subject before you and study the colours very carefully. As you become more experienced in the use of

colours you will see more and more colour in your surroundings. For instance, we all know that grass is green, but in sunlight it may appear as yellow, in shadow it may appear as blue or purple, and in certain lights and at certain distances it may appear as any one of a variety of greens.

There is no black in nature. You will be very mistaken if you think there is. Even the darkest tones are some colour, such as very deep purple, or warm brown. So you see there is colour to be seen in the most grimy of cities—and very beautiful colour, subdued though it often is.

Try to finish off your sketch in one "fluid" operation, that is, without allowing any of the colour to dry off. If the surface does begin to dry before the sketch is finished, do not attempt to work it wet again with more water. Leave it alone to dry thoroughly, then wash more colour right over it or take off some colour as required. Do not stir your colour too much on the paper and never on the palette or the resulting mixture will most surely be like mud.

When you have finished the sketch, stand away from it at a distance and compare it with the original, criticising it thus:—Are the light parts light enough and the dark parts dark enough? Is the colour pure enough and at its true value, or is it dirty and dull? Are the edges emphasised too much? Does the sketch look flat through lack of contrast? Is there too much detail in the background and in the foreground?

If you are somewhat disappointed with your efforts, do not dismay. You have at least experienced the thrill of trying to express nature on paper, and had some practice in sketching out of doors. You can learn a lot by making mistakes.

Your next sketches can be of trees. Trees require some amount of intelligent treatment if they are to be sketched successfully. Beginners usually find it rather difficult to make them look real. This is because they do not see the trees as a whole, but as bewildering masses of leaves and branches.

Well, select a simple tree and get ready

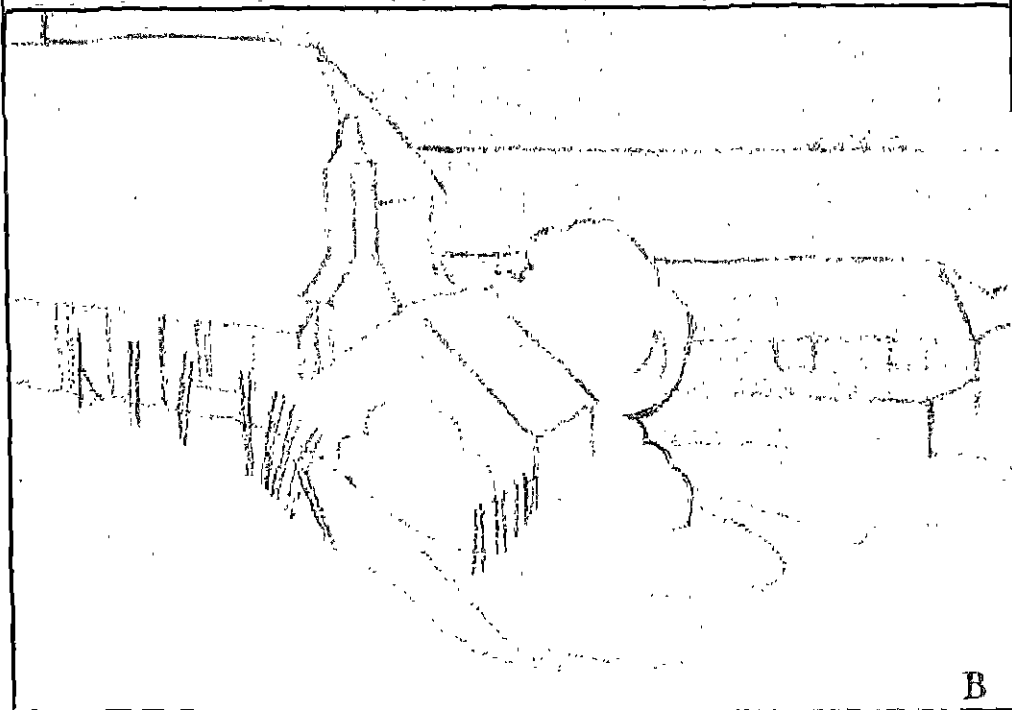
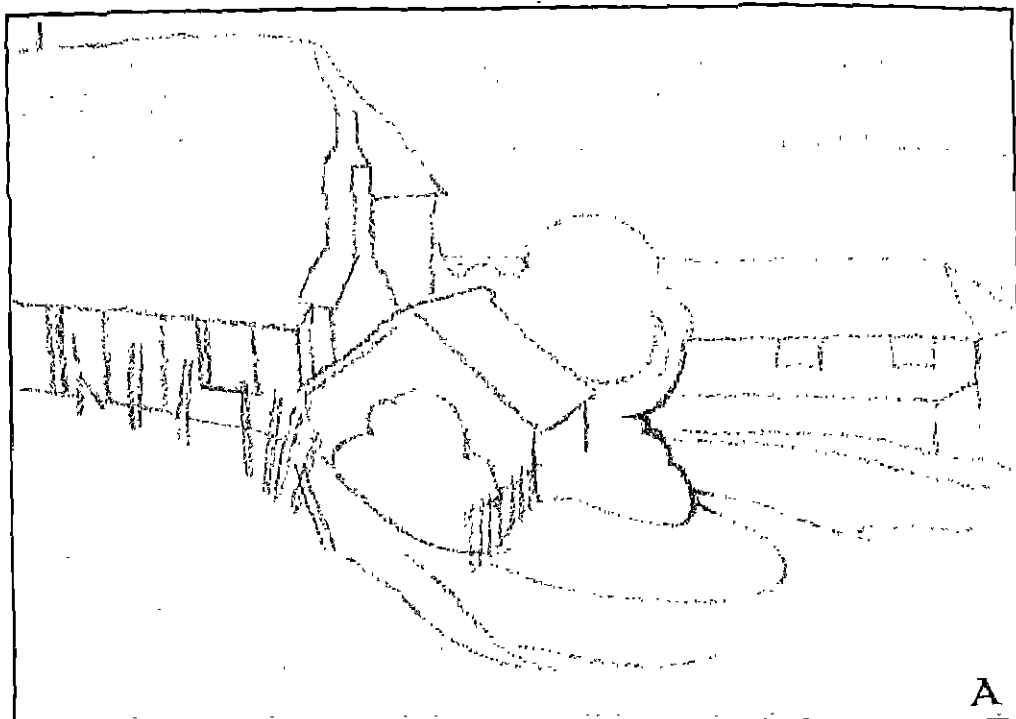


PLATE VII
MAKING A WATER COLOUR SKETCH—PART I

- A. Mass-shapes roughed in with pencil.
B. Sky and distance laid on.

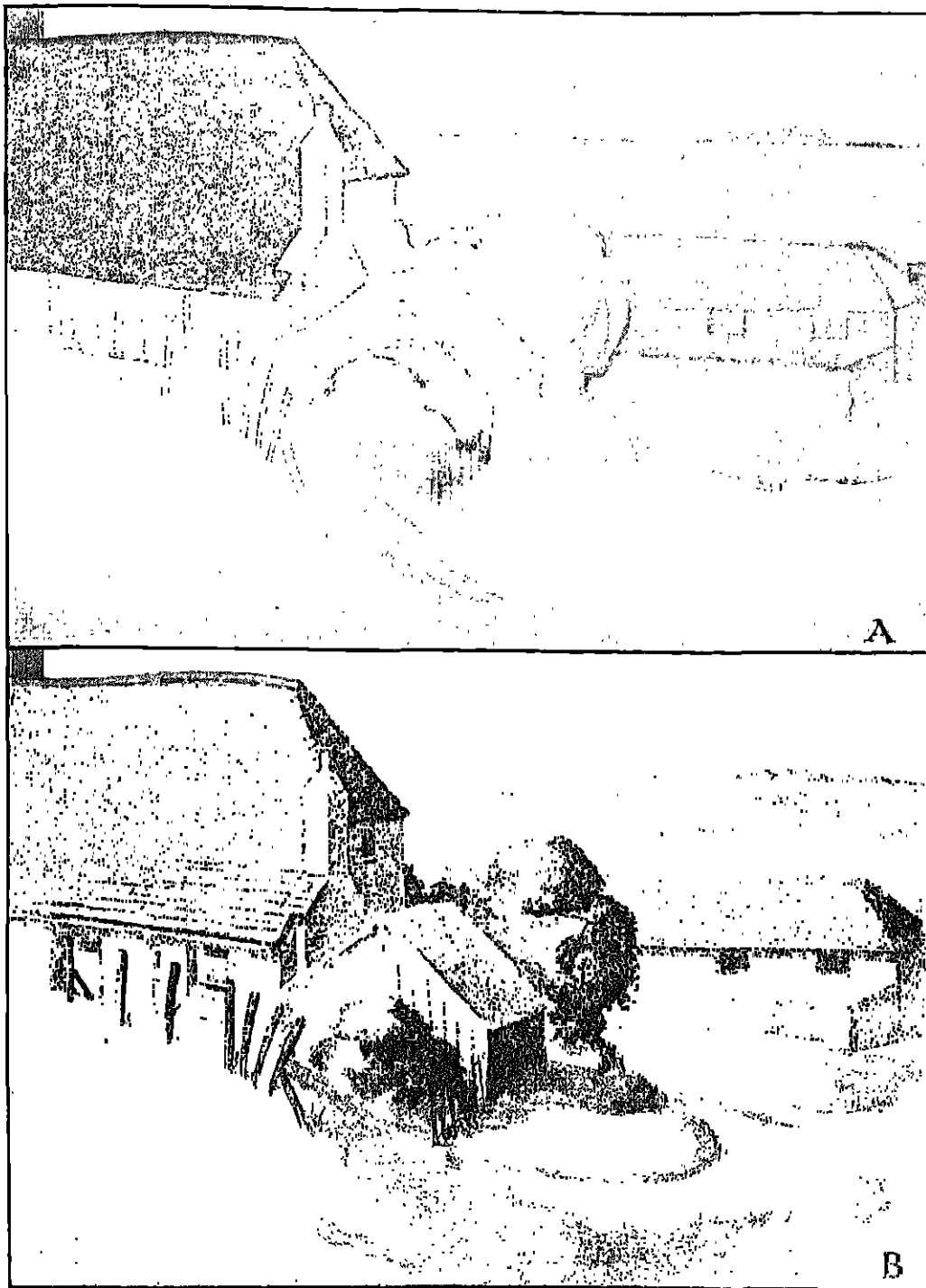


PLATE VIII
 MAKING A WATER COLOUR SKETCH—PART 2

- A. Middle distance laid on while sky and distance are still damp. Foreground added.
 B. Shadows laid on and the finishing touches added.

to make a sketch in pencil. Before you begin, look well at the tree. Half close your eyes and try to see it as a whole, ignoring leaves and small details. Think of it as a framework of branches growing from a stem, or trunk, with a mantle of foliage draped over it to form a mass, having one side in light and the other in shadow.

Make a note of the outline of the tree shape. Each type of tree has its own peculiar shape, Fig. 17. The oak has ragged and lumpy with here and there bare, forked branches showing through. The willow is graceful and fairy like, with a feathery outline, sometimes pollarded, or lopped off at the top with a dense head of young branches. The lombardy poplar is tall and finger shaped,

to bring your sketch along from a few vague pencil touches to give size and position, adding darker tones until the sketch is complete.

Next, give form to the tree by putting in the shadows, the lightest first and the darkest last. Make use of the pencil strokes to indicate the growth of the foliage. Keep the treatment broad and keep the light side rather free from texture and small details, Fig. 18B.

Strive to feel the roundness of the tree as you draw, as though you were sketching a ball. Try to convey the feeling of the branches radiating from the trunk, foreshortened as they come towards you.

Do not forget to draw as vigorously and directly as you can. Keep the drawing as

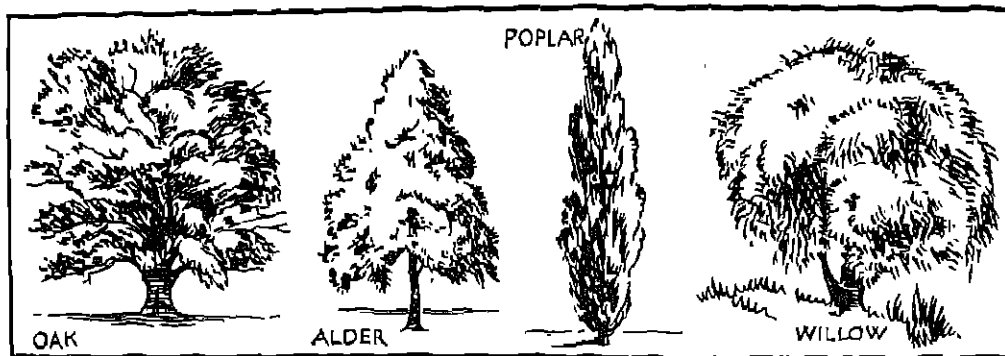


FIG. 17. CHARACTERISTIC TREE SHAPES

pointing to the sky. The elm has a rounded mass of foliage of tightly packed small leaves. Wind also changes the shape of trees.

Notice the pattern of light and dark: the light surfaces of the leaf masses and the dark of the cavities. Observe how the branches projecting towards you are foreshortened.

When you have studied the tree carefully and have impressed it well on your mind, you can begin to sketch. Very faintly rough in the limits of the tree masses, Fig. 18A. Notice how this is beautifully balanced on the trunk support. Divide the large mass into smaller masses and suggest the disposition of the visible branches. Do not forget

fresh as possible. Take care not to make your sketch look fussy by overworking it.

When you have put the last touch to the sketch, hold it at arm's length and compare it with the original. Criticise it by asking yourself:—Are the tones correct in strength? Does the tree look round and solid? Does it look as if it is growing?

The next trees you sketch can be done in pen and ink. The practice you have had in drawing them in pencil will have helped you to appreciate the need for broad expression of form. Begin your sketches by carefully and faintly roughing in the shape of the tree in pencil. Then suggest the divisions of the masses and the disposition of the branches showing through. Next, indicate

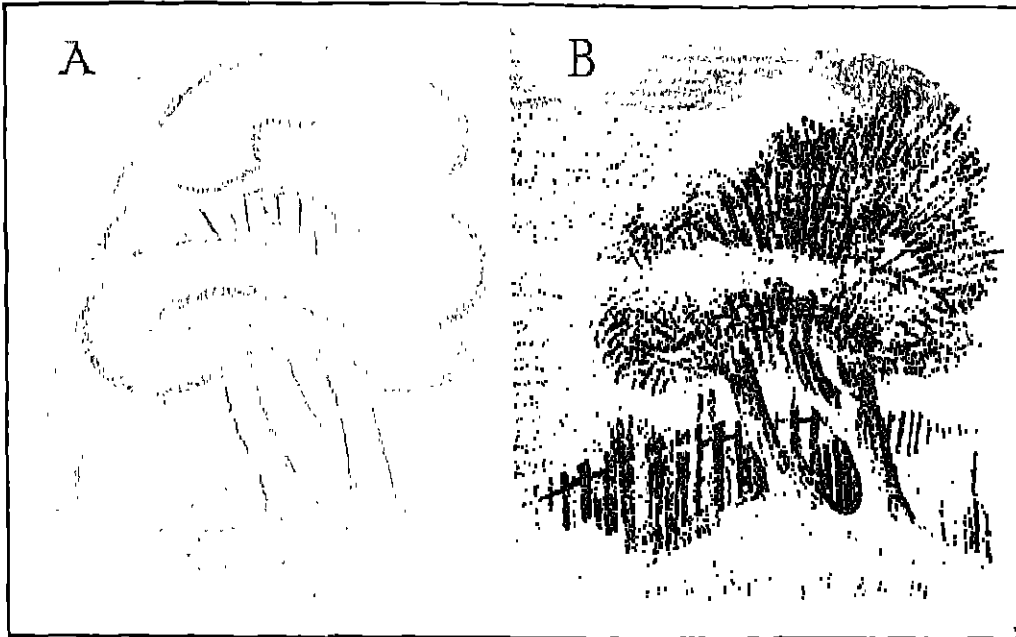


FIG. 18. PENCIL SKETCH OF A TREE
A. Foundation. B. Finished sketch.

the shadows and masses of shade, so as to give some form to the tree.

On this foundation work, you can base your pen drawing. Build up the sketch, beginning very lightly, adding form and character as you work. Try to express the roundness of the tree and its growth by the nature and direction of your pen lines and textures.

Keep the lines and masses simple in treatment. Over-elaboration destroys the freshness and vigour of a sketch. You will find that it is not carefully finished details but essential facts that tell the story in the most impressive way. Experience will teach you to recognise these essential facts. At first the beginner is tempted to put in all the minute details in an effort to render the sketch more truthful. The result is that the eye of the beholder is confused and misses the more important expression of form and perspective. Never use your art as a substitute for photography, which is a mechanical means of representing nature on paper. Use your imagination and try to

express your own personal impressions of the beauties that surround you. Remember the sketcher's motto: "It is better to leave out, than put in unimportant details!"

The outline of your tree sketch should not be much more than mere touches in an attempt to give the effect of movement along the edges of the foliage. The trunk must be made to look round and solid as compared to the fluttering mass of the foliage.

When you have practised sketching trees in pen and ink, you can next turn your attention to sketching them in colour.

You can start by roughing in the limits of the trees in pencil, just a few very light touches to indicate the shape and positions of the masses. Plan out the positions of any branches showing through taking care to convey a feeling of growth and rhythm, Pl. IX A.

Next, take a wash of colour right over the sky so as to make a wet surface on which to work, Pl. IX B. Keep the sky colour very pale. Half close your eyes and compare

the tones of the sky and tree to discover how pale. Now, wash in some distance, keeping it clean and simple. While the sky is still damp, paint in the lightest parts of the trees (Pl. IX C) then the next lightest and so on to the darkest, Pl. IX D.

Do not attempt to show the leaves and branches in detail. Paint your trees in the mass, treating them broadly so as to convey a sense of the breadth of nature's majesty. The inner forms can be laid on as flat washes of colour, but pay careful attention to the edges. Try to appreciate and to express the lovely, fluttering pattern of the edges of the foliage. This will need some careful practice. Take care not to lose the sense of the trees' roundness by over-emphasising their outlines. If a few small flicks of white show here and there in your painting, leave them to add sparkle and life to the trees.

Observe well how the colours of the trees change and are blended. In the sunlight they will appear a variety of yellow-greens, produced in your sketch by the mixture of gamboge and ultramarine blue in different proportions. As the shade increases, more blue and some crimson should be added.

The colour of the trees will vary according to the type of tree, time and position. It will range from a variety of soft, yellow or orange-greens in the spring, to the luscious ripe greens of summer and the glowing reds and oranges of autumn. The sun, as it rises, moves across the sky and sets, will impart many wonderful changes of colour—red, yellow, blue and purple. According to the distance at which they are seen, trees may be almost blue, tinged with red, or beautiful soft purple. Surroundings also have a marked effect on the colour of trees in the form of reflected light in the shadows and in the form of colour contrast.

The tree trunk and branches may next be put in with drier colour while the foliage and background is still wet. These are never pure brown, but may be green-grey, or green-purple, tinged sometimes with red, yellow or blue.

Finish off the sketch by floating on a simple pale colour for the foreground bringing it down darker to the bottom to give a sense of approach to the ground; then add any ground shadows. Remember to paint in one operation, as you did when you sketched the cottage.

Often look at your sketch from a distance and correct it at once, when necessary, with your brush, or sponge. If you should wish to lighten some parts of the tree, lift off some of the colour while the paint is still wet. If the paint is dry, draw on the shape of the light with water. Leave it almost to dry, then take off the required amount of colour with a rag, or dry brush. If you should wish to increase the intensity of some of the light parts, obtain the desired result by contrasting the light with something very dark placed by its side.

Never leave off drawing—no matter if your subject is a tree or any other object—even when you are painting. Apart from recording the colours as truthfully as possible, continually be noticing the perspective and try to feel and express form and position.

Notice the way in which the trunk grows—naturally—out of the ground and the radiating arrangements of the roots where they show.

Haystacks make good subjects for sketching, Fig. 19. They are usually interesting in shape, either in their whole form, or when they are partly cut away. Their colour is also very lovely, being a variety of warm yellows and golden greys.

First of all, make pencil sketches of them, see them as whole forms, lumpy and somewhat like loaves of bread. Sometimes they are oblong in plan with a gable-roof and sometimes they are circular in plan with a conical roof. Try to feel their thickness through, their solidity, with soft rounded edges. Notice the lightest parts and the changes of tone in the darkest parts.

Study these points carefully, then lightly rough in the mass-shape of the haystack. Next draw in the shadows, the lightest and then the darkest. Notice the slope

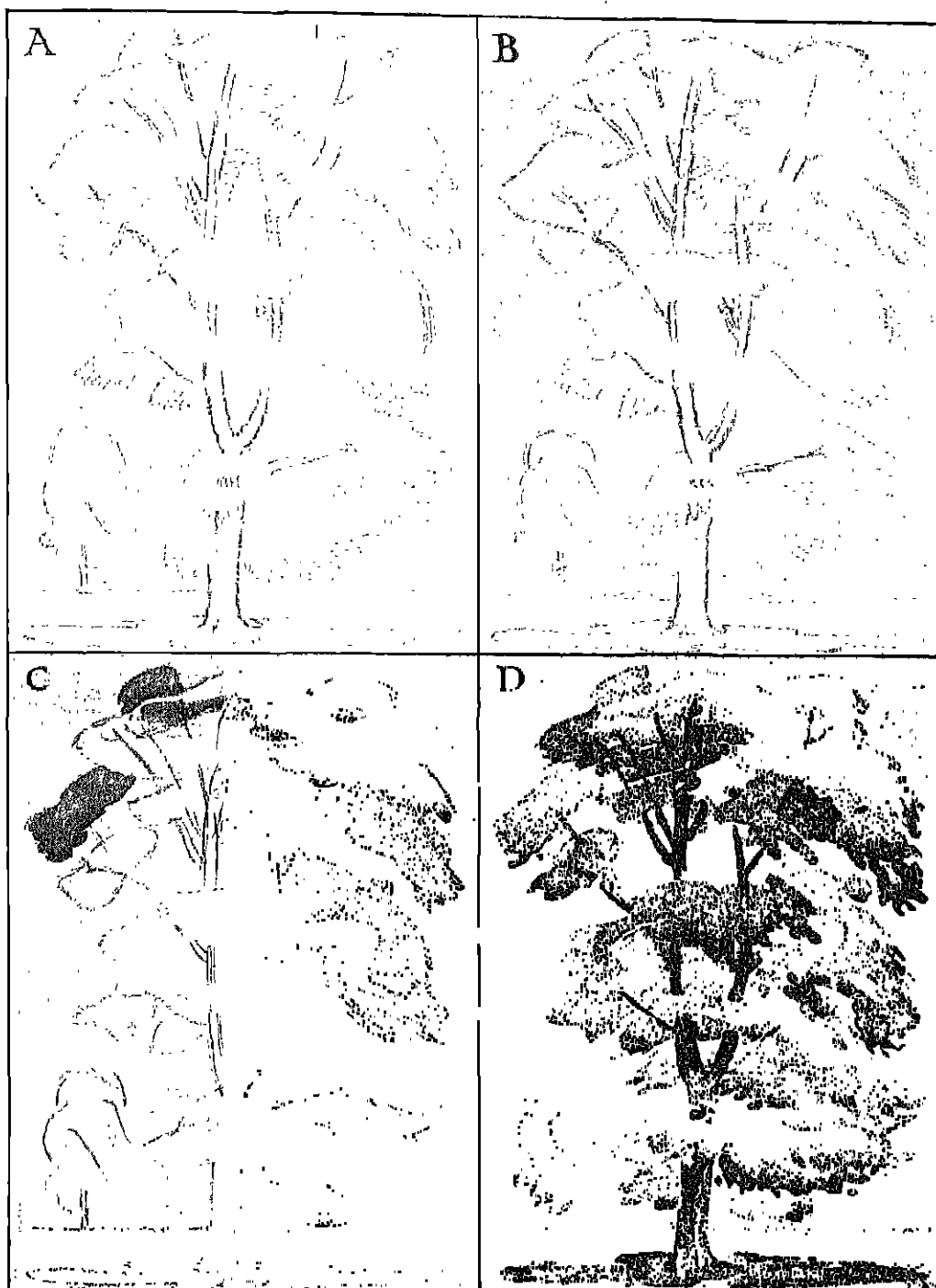


PLATE IX
WATER COLOUR SKETCH OF A TREE

- A. Light pencil foundation.
 B. Wash taken right over the work except for one patch higher than the sky.
 C. Lightest parts of tree and distance washed in.
 D. Shadows added and finishing touches put in.

of the planes of the sides and roof. When you are sketching in pencil, try to imagine that you are modelling. Your pencil is the modelling tool and the range of tones it produces is the clay. Just as you begin with a lump of clay and gradually shape it up to a finish, so you must begin faintly and somewhat roughly, building up the form with tones and finishing off with the darkest parts.

In sketching haystacks, be sure to draw them in correct perspective. If they have

lines to suggest the texture of the hay and the directions of the planes. Notice how the stack is thatched. Do not be tempted to fuss over the surfaces with texture, thereby losing breadth in the drawing. Keep the light side more or less plain. Try to convey the feeling of the soft, strawy edges.

When you sketch haystacks in pen and ink (Fig. 19) use few and simple lines. Notice where the edges are broken with loose hay. Keep the treatment broad and use simple

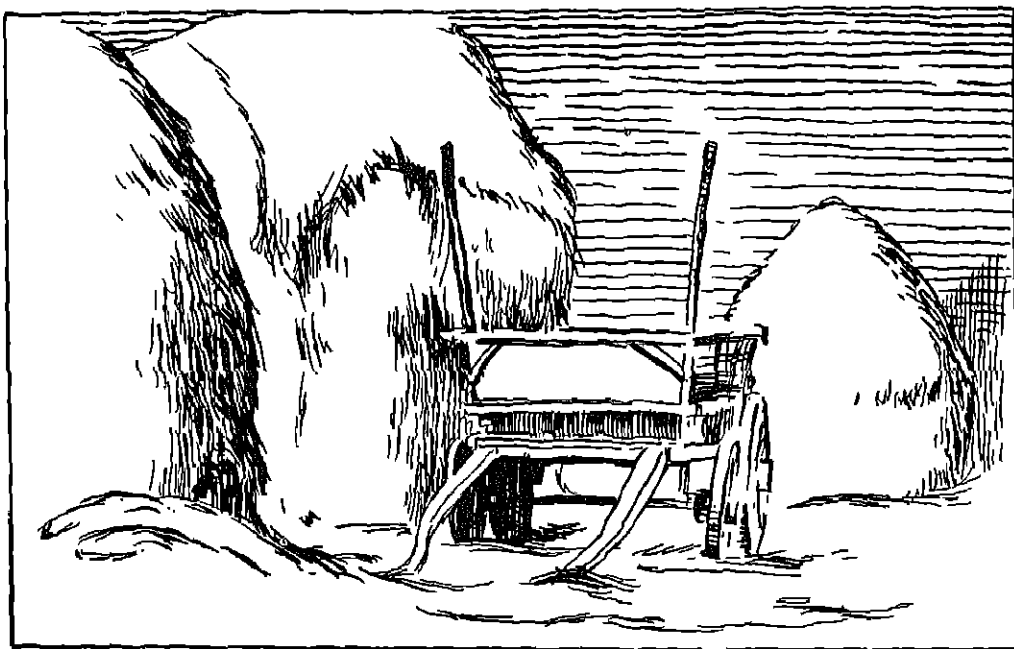


FIG. 19. PEN SKETCH SHOWING TREATMENT OF HAYSTACKS

straight edges, notice how much the lines slope to the horizon. Or if they are round in shape, notice how much the edges are curved according to their position above, or below the eye level. Give the haystacks firm bases, by suggesting the ground lines round their bottom edges. These base lines must not be heavily drawn, hard lines, but must be broken here and there to suggest the loose hay round the bottom of the stack.

As you build up the tones, use the pencil

masses of texture, leaving the light parts plain. Try to express the planes as well as you can. See how well you can convey the feeling of lumpiness and soft edges and do not forget to lose the outline as much as you can, putting most contrast and finish on the parts nearest to you.

Haystacks are simple to sketch in colour. Look through your view finder and select a pleasant picture with some sky, some distance, the haystack and plenty of foreground. Take care that the distance does

not cut the picture in half and arrange the picture so that the mass of the haystack is a little to one side. There should be more sky than foreground.

Flood on the sky, working from top to bottom, then put in the distance. This last will probably need to be slightly bluish in contrast to the golden yellow of the haystack. Then paint in the haystack up to the still wet sky and distance. Lay on the light parts with pale gamboge and perhaps a slight touch of crimson. The dark parts will require more blue and crimson according to the depth of the tone. If the sun is shining, notice the amount of reflected light on the shadow side. The edges may need a few touches to suggest loose hay, but for the most part they should be soft.

The foreground will most likely be golden with loose hay and straw. Lay it on pale, bringing it down cleanly and darker to the bottom. Lay on green grass. Do not make the change abrupt in tone, keep the two colours of the same tone, or rather as one evenly gradated wash.

Animals such as cows, sheep, pigs, horses, rabbits and squirrels are plentiful in the country. They are very interesting to sketch, but they are not easy to do. For example, directly you approach a sheep within sketching distance, away the silly thing moves! No animals will keep the same pose for you for more than a few minutes, thus making a finished drawing almost an impossibility unless you can sketch rapidly and partly from memory.

The best way to sketch animals is to view them from a safe distance, so that they are not disturbed, and make quick studies of them. After a little practice and careful observation, you will have your memory to aid you when you sketch animals.

Before you begin to sketch them, it is well to learn something about the formation of the bones underlying the forms of the animals, Fig. 20. The legs of an animal are comparable to the limbs of a man: the hind legs to a man's legs and the forelegs

to a man's arms. Starting at the pelvis, the hind legs each consist of three main bones, the femur (Fig. 20 A B) running forward and joining the tibia, Fig. 20 B C. This runs back to join the metatarsal (Fig. 20 C-D) on the end of which is the paw, or hoof, Fig. 20 E. The movement of these bones gives to the legs a powerful spring action which enables the animal to gallop and jump (Fig. 21) as seen in the horse and rabbit. The joint B in Fig. 21 is not always visible, being covered with fur or skin, but

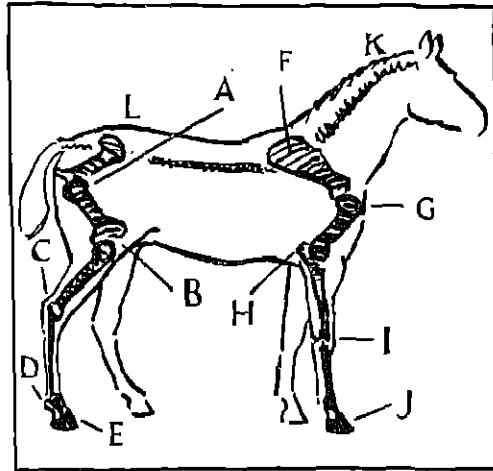


FIG. 20. LEG BONES OF AN ANIMAL

- | | |
|--------------------------|------------------|
| A-B. Femur | H-I. Radius |
| B-C. Tibia | I-J. Lower leg |
| C-D. Metatarsal | J. Hoof, or paw |
| E. Hoof, or paw | K. Neck |
| F-G. Shoulder or scapula | L. Lumbar region |
| G-H. Humerus | |

it is most important to realise its existence when sketching animals, so as to give the proper action to the hind legs. The forelegs begin at the shoulder, or scapula (Fig. 21 F-G) which slopes forward. Pointing back from this is the humerus, Fig. 21 G-H. Joining this are the radius (Fig. 21 H-I) and the lower leg (Fig. 21 I-J) ending with the paw or hoof. The elbow joint (Fig. 21 H) is another important joint easily overlooked when sketching animals. The front leg bones open and close with the same action as the hind ones. In both cases the paws, or hoofs are set forward.

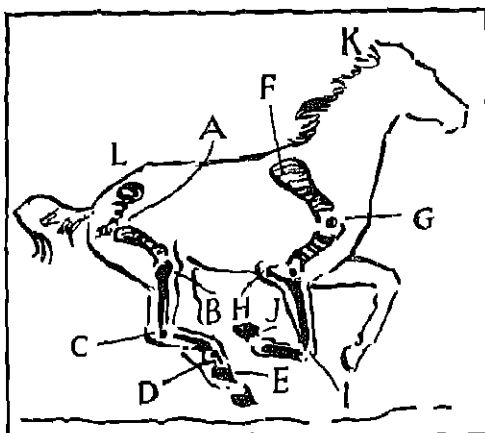


FIG. 21. ANIMAL IN MOTION SHOWING MOVEMENT OF BONES

A-D. Femur
B-C. Tibia
C-D. Metatarsal
E. Hoof, or paw
F-G. Shoulder, or scapula
G-H. Humerus

H-I. Radius
I-J. Lower leg
J. Hoof, or paw
K. Neck
L. Lumbar region

The spine is mobile at the neck (Fig. 21 K) and the lumbar region (Fig. 21 L). The bulk of the ribs, depending from the spine is barrel-shaped. The head varies in position and shape according to the type of animal. Horses and cows have elongated skulls with long straight noses. In horses, dogs and deer, the head is held above the back line, while in cows, pigs and rabbits the head is dropped below the back line.

When you are sketching animals, try to grasp the whole form. If they are standing (Pl. X E) try to appreciate their bulk balanced on their legs. If they are lying down, notice how their bulk form follows the surface of the ground, Pl. X B. The form suggests a barrel supported on four legs with the neck growing out from one end, Fig. 22. Notice the perspective of this barrel form. Note the line of the spine running down the back of the animal from the head to the tail, Pl. X A. Observe the general mass and its light and shade. Half close your eyes so as to ignore the small details.

Parts of fences, gates and stiles are worth sketching. Wooden fences are the most interesting and there are many kinds of

gates and stiles. There are barred gates leading into fields and farmyards (Fig. 23) garden gates and lich gates leading into churchyards. Get into a position to sketch them so that you view them slightly sideways.

When you come actually to sketch them in pencil or pen and ink (Fig. 24), notice the perspective of the cross bars, rails and ground lines. Notice the direction of the grain on the wooden uprights and cross pieces. Use your pencil or pen lines to express the grain and direction of the posts

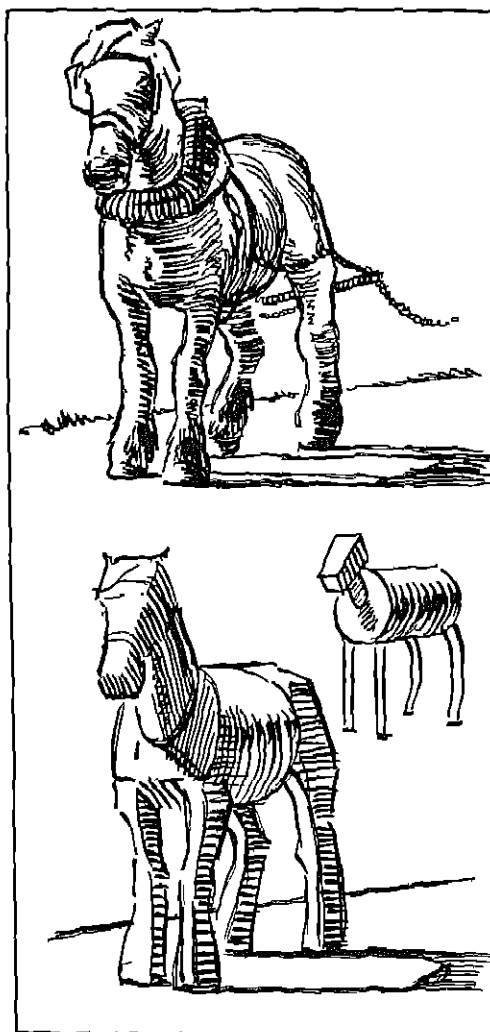


FIG. 22. FORM OF THE BULK OF A HORSE

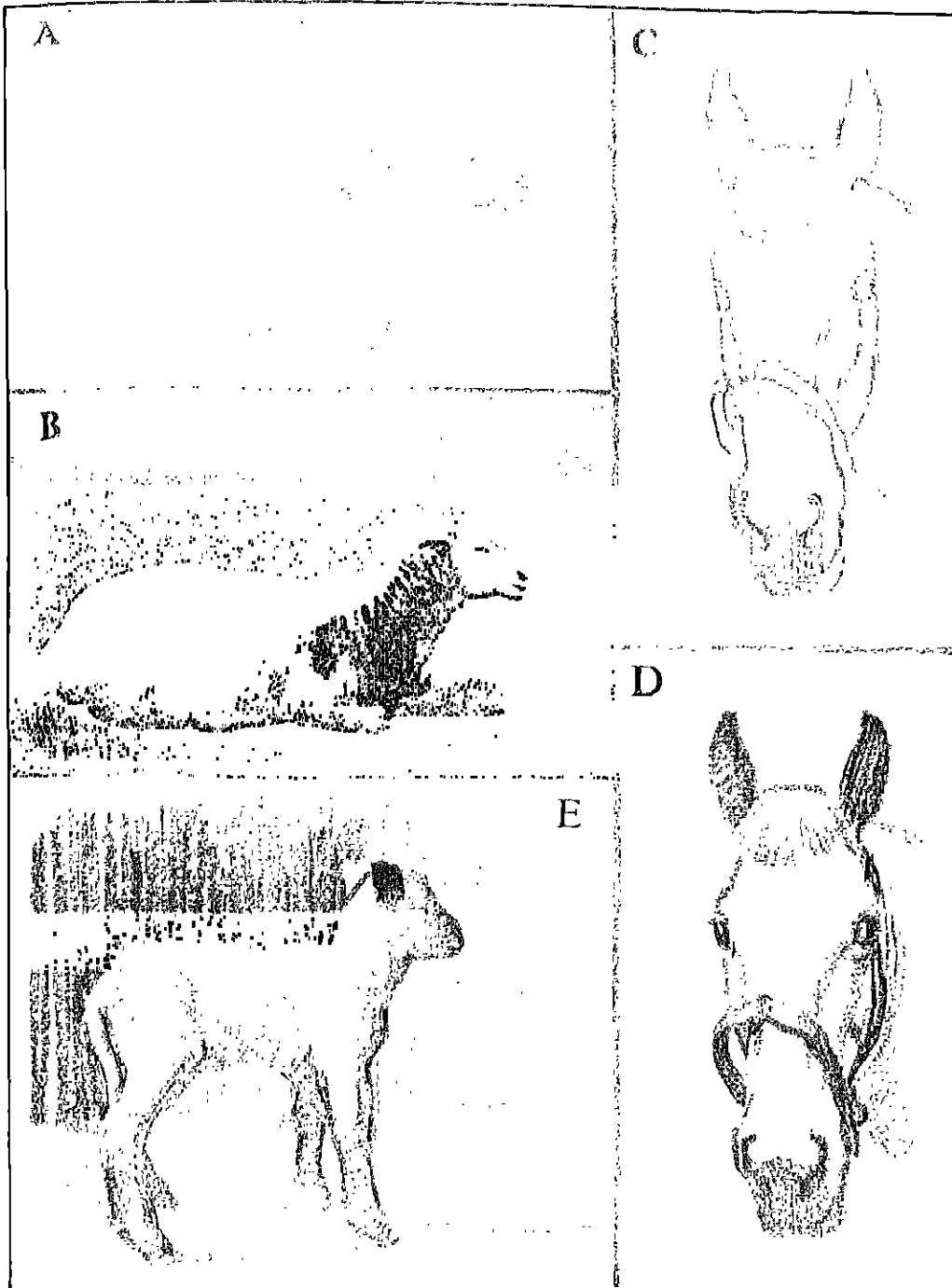


PLATE X.
QUICK SKETCHES OF ANIMALS

- A. Pencil rough out of sheep.
- B. Finished water colour sketch of sheep.
- C. Pencil foundation of horse's head.
- D. Finished pencil sketch of horse's head.
- E. Pencil sketch of lamb.

and bars. In drawing, try to see the shapes of the spaces in between the uprights and cross pieces. These usually make an interesting pattern. Express the light and shade carefully; suggest the thickness of the wood.

Sometimes old walls of stone or brick are worth sketching. The disposition of the blocks of stone make interesting, sometimes irregular patterns. And often grass, or plants, such as pennywort, house-leek,

There are many excellent things to take note of in the country, apart from cottages, animals and trees. There are clumps of bushes making pleasant shapes, such as gorse and broom; endless varieties of plants, such as thistles, nettles and foxgloves; water-side plants, such as reeds and rushes, and many different grasses. These make excellent studies and will help you to appreciate shape, line and colour.

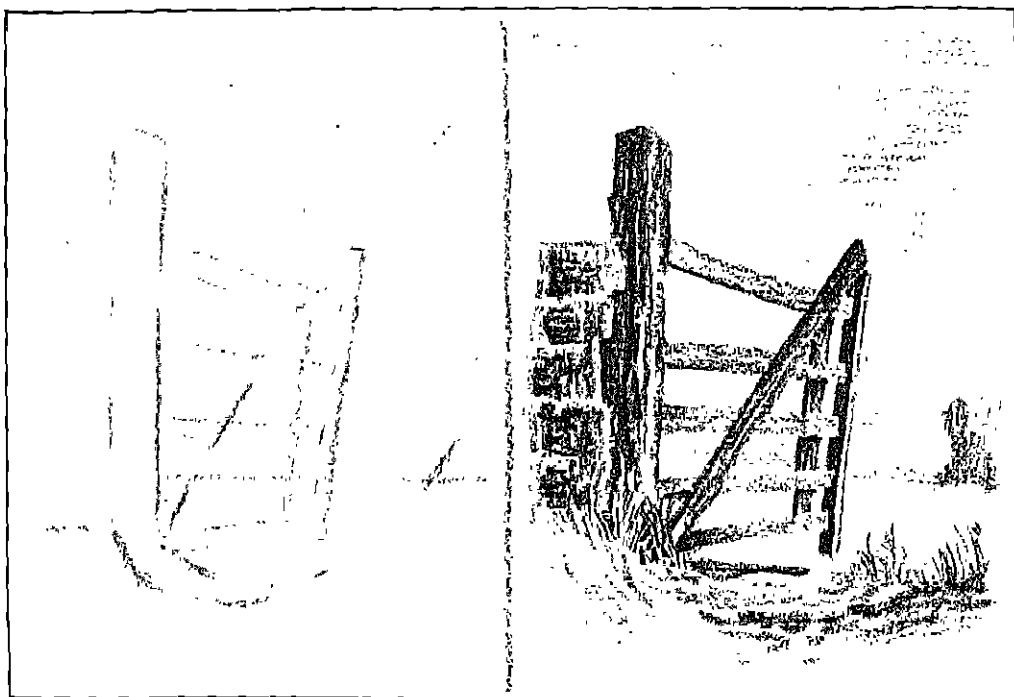


FIG. 23. LIGHT FOUNDATION AND FINISHED SKETCH OF GATEWAY DRAWN IN PENCIL

stonecrop and wallflowers grow on old walls and add interest to the sketches.

You can make your sketches in colour. Old walls have charming colours in them: greys, reds, yellows, blues and greens; so have fences, weather-beaten and lichen covered. Perhaps you would not think so, but old tree stumps are interesting to sketch as studies for form or colour. They usually have interesting shapes and the pattern and colour of their bark is well worth noting, if not sketching.

Coming back to bigger and man-made objects, there are always churches to be seen here and there about the country. These will be fine to sketch when you have had some practice in sketching simple objects. Some churches are ugly and some are difficult to draw, but there are some very old ones that are simple and beautiful. You will probably find that these were built somewhere about the 12th century and belong to the Norman and Early English periods of architecture. You can recognise

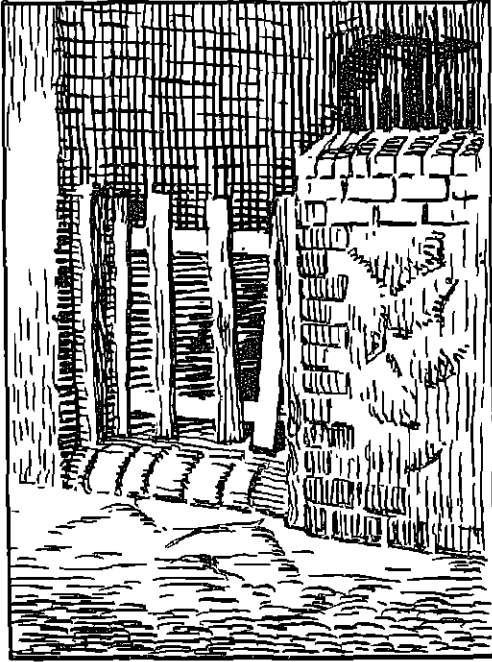


FIG. 24. PEN AND INK SKETCH OF
WOODEN GATE

the first style by its round arches to the windows (Fig. 25 A) and the second style by its roundly pointed arches to the windows, Fig. 25 B.

Choose your position outside the churchyard,—then you will offend no one. Select a pleasant, simple picture of the church,

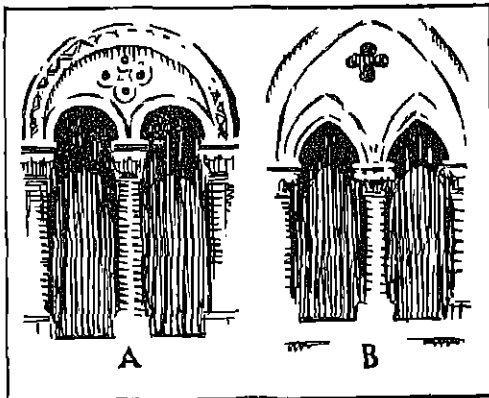


FIG. 25. STYLES OF ARCHITECTURE

- A. Norman window arches.
- B. Early English window arches.

using your view finder as an aid. Have sufficient foreground, some sky and some distance. If there are trees in the background, arrange them so that they fall into a simple mass, or masses. Always simplify the subject in your mind and decide what to leave out before you begin to sketch. As an artist, you are at liberty to move objects a little to one side or the other in order to improve the grouping of several objects.

As with previous subjects, make your first sketch in pencil. Examine the church very carefully and acquaint yourself with its form as a whole and the broad effect of light and shade. Look at the church through your view finder and mark in your mind what is the central object of interest. Possibly it is a door (Fig. 25) a window, a buttress, or a striking effect of light and shade on an angle of the roof. Perhaps some line, such as that of a path, leads your eyes almost forcibly up to a door or some other part of the subject. Having noticed it, make it the centre of interest in your sketch, but it must not be situated in the exact centre of your sketch.

Rough in the masses of the subject and plan in the windows, doors and other details of construction. Notice if any lines lead directly, or indirectly, to the point of interest, and, if so, emphasize them. This does not mean make them more black, but insist on them by making them simple and more telling in direction. Thus, the edge line of a roof pointing down to the door, the tips of grave stones seen one behind the other running down to the door, the edge line of a tree, or bush, trickling over and down to the door, and the edge of a shadow pointing in the direction of the door. Use these or any other lines to lead the eye of the beholder away from the edges of the picture, in to rest at the centre of interest.

Be careful to draw the church in correct perspective. Measure the proportions carefully. Take care with the drawing of the doors and windows and architecture of the

building. Notice how the buttresses add support to the walls. Try to feel the simple beauty and the ancient dignity of the place, a monument to those who built it. Try to get some feeling into all your sketches.

Add the tones of the shadows and express the texture of the walls and roof. Try to preserve the feeling of flatness and support, no matter how rough in texture the walls

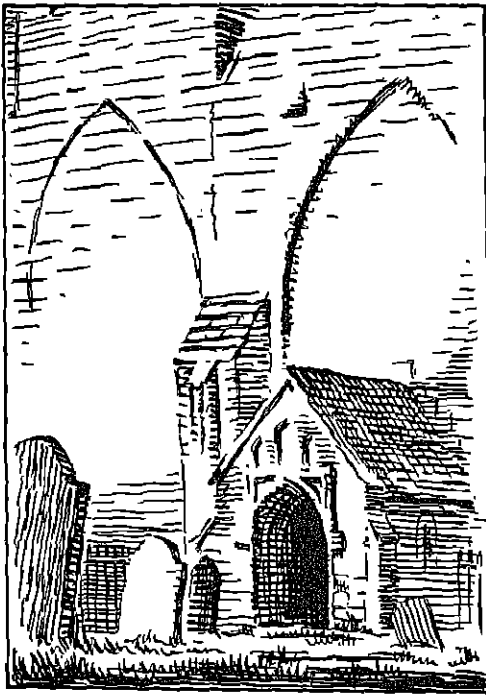


FIG. 26. GREATEST CONTRAST RESERVED FOR CENTRE OF INTEREST—IN THIS CASE, THE DOORWAY

are. Do not forget to limit the amount of texture on the lighter parts. Express the direction of the wall and roof planes with your pencil lines. Keep the whole as broad as possible in treatment. Do not be afraid to strike notes of contrast with the tones, but reserve the greatest contrast for the central point of interest, Fig. 26. Keep the distance and sky in the background and very simple. Suggest the ground plane receding into the distance and keep it as undisturbed

as possible. Do not forget to look frequently at the original and to give your work a good criticism at the finish.

When you come to sketching churches in pen and ink (Fig. 27) keep your line very simple and as expressive as you can. Limit your textures to the shadow side. Simplify all your work.

Painting churches in colour is a joy. There are such beautiful colours in them: lovely greys of the walls, orange, red-greys of the roof and possibly the dark rich green of a near-by cedar tree.

Paint the sky as a simple wash, then get in the distance. Next mass in the main colour divisions of the church. Then flood on the foreground, simple and gradated from pale down to dark. Do not break the surfaces of the walls with too many changes of colour, especially those in the highest light. Keep them even in tone to suggest flatness. Put in the shadows carefully. If there are any shadows across the foreground, keep them broad. Flood them right across any underwork, losing the unnecessary detail. Strike the greatest contrast of tone and colour at the centre of interest and keep the picture more quiet to the edge. At frequent intervals view your sketch from a distance, comparing it with the original, correcting any mistakes when they appear. Treat your sketches in a simple way and do not fuss them. Try to see the subject as a pattern of tones, lines and colours as well as a collection of planes and forms in perspective.

When you have had some amount of practice in colour work, it would be a good idea to make some water colour studies in monochrome, that is, in one colour, such as black, or sepia. In this way you will paint the tones of the subject, noting their strength, gradations and contrasts. You will need to pay great attention to the drawing and form. These are really far more important than colour although colour is so attractive. Form and distance cannot be expressed by colour alone, but by tones of colours and by perspective in drawing.

Here are some reminders:—

1. Do not be careless! Draw as truthfully as you can.
2. Do not be impatient! Begin with the lightest parts, finish with the darkest parts.
3. Do not be vain! Look more at the original than at your own sketch.
4. Do not be mean! Use full strengths of tone and colour and plenty of water with your colours.
5. Do not be fussy! Leave out, rather than put in, unnecessary details.
6. Do not be dismayed! Your next sketch will be better than your first, and the next after that, better still.

Teaching hints.—In this chapter, the children have been using their pencils, pens

and water colours. There are two things very noticeable in beginner's work: (1) There is the wish to sketch subjects that are too large and too difficult, and (2) there is lack of simplicity.

To the untrained, the first difficulty to present itself is the amount of surroundings to be included in the sketch. At first, the impulse is to want to attempt large expanses of landscape and complicated groupings of houses and trees. The details are many, the drawing is difficult and the lighting effects are intricate. These, together with the lack of experience in the use of the materials, result in a sketch that is usually badly composed, lacking in simplicity and confused in form. Strangely enough, although beginners feel it necessary to include this and that

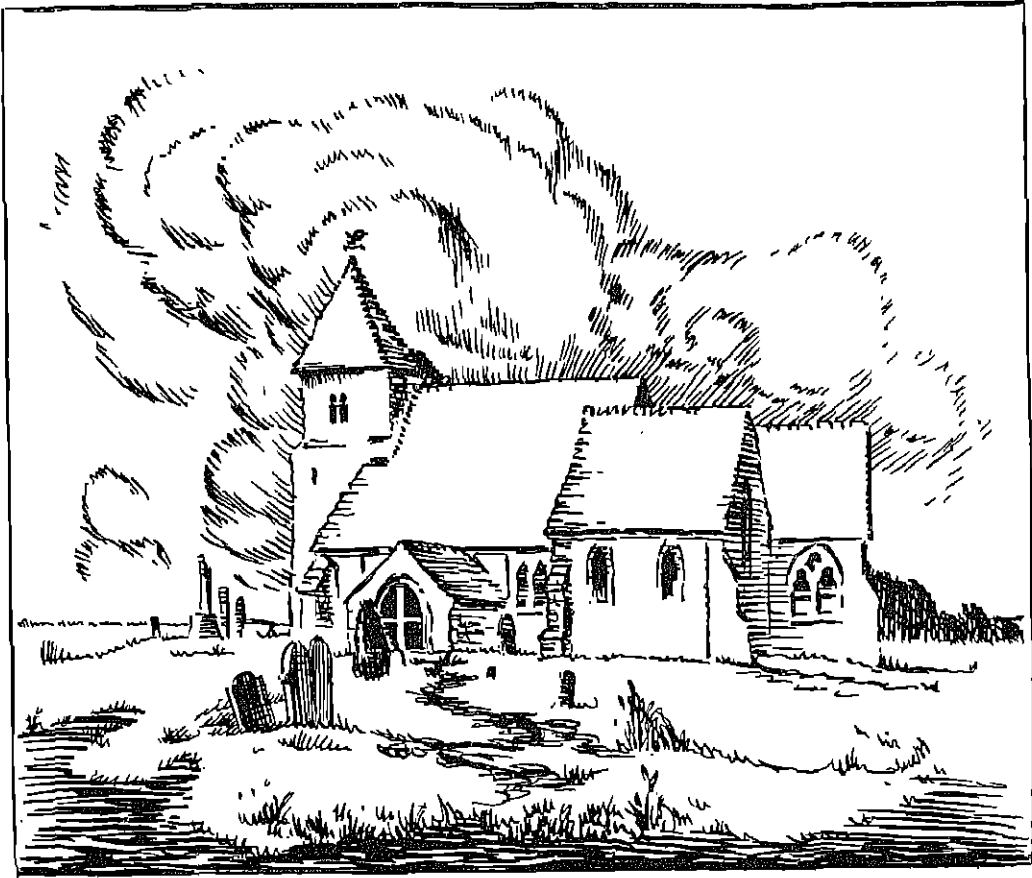


FIG. 27. PEN AND INK SKETCH OF CHURCH

detail in their pictures, they rarely appreciate the fact that details, alone, make the best subject for sketches: details of landscape, such as a gateway, a portion of a hedge with a tree, a corner of a farmyard, or a haystack.

Simplicity must be the sketcher's motto—simplicity of subject, simplicity of treatment, one may almost say, simplicity of truth. Truth is necessary in sketching, but it must be broad truth, tempered by the sketcher's individuality.

Let the children choose simple, easy subjects to begin with. Teach them to look for

express the planes and form of the whole. Much more depends on drawing and form than on colour. This is because in sketching nature, it is necessary to represent distance. This can be done only by the application of the theory of perspective, consisting of drawing and not colour. Colour without form gives little indication of position unless it be the gradual bluing, or greying, of colours as they recede into the distance, due to the thickening of the atmosphere. But it is possible to have a red several yards away, more striking to the eye than a red close at hand.

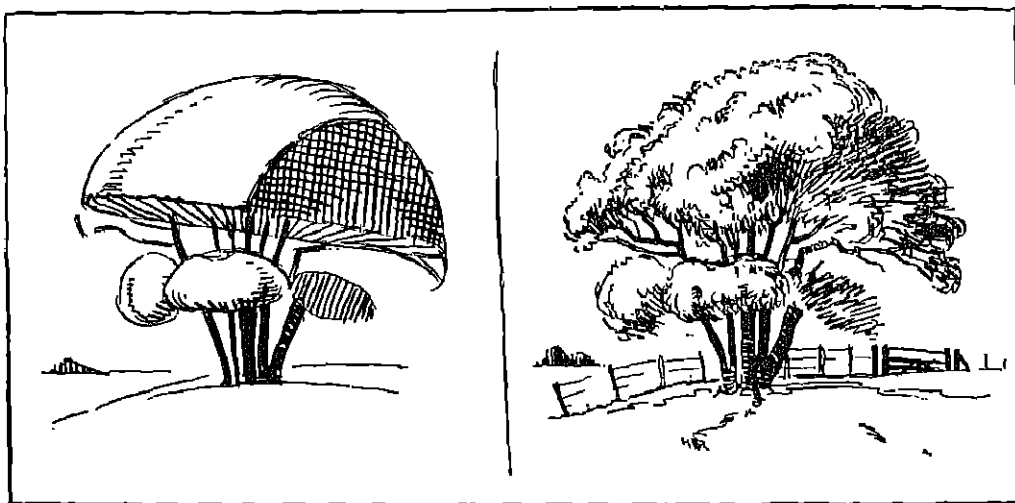


FIG. 28. TREE AND ITS IMAGINARY SIMPLIFIED MASS SHAPES

and appreciate breadth of form, sacrificing subsidiary detail to the general form and important masses. Thus, for example, a house becomes a simple form of a box with a ridged roof in perspective. The chimney stacks, dormer windows, porch and out-buildings are necessary additions. Windows, doors, tiles and textures are subordinate to the planes on which they appear. In sketching the house, the first consideration must be to determine the position and proportion of that simple form—a box with a ridged roof. The sub-forms—chimney stacks, out-buildings, porch and so on—are added next; finally, the texture and tone are used to

Trees and bushes must be seen as solid masses, and lumpy in form. To the untrained eye, trees are problems consisting of a maze of boughs and leaves. Actually, as masses, trees are very simple (Fig. 28) and young children get nearer to the truth of representation than is imagined when they show a tree as a simple round smudge on a stick for a trunk. Some knowledge of the way in which the branches give solidity of form to the tree will be useful. The branches are similar in idea to the ribs of an umbrella—the trunk compares with its handle and the covering of foliage is like the cloth of the umbrella. To draw animals requires a

knowledge of cubes and cylinders in perspective: cubes and cylinders for heads and bodies, supported on posts, which are the legs.

Some water colour sketches can be done in monochrome. This includes the practice of form with tone and water colour technique. It is very good practice. Some of the old masters of water colour painting, such as Claude and Turner did many of their studies in monochrome; the former used sepia to give effects of light and shade.

A fault to be found with the work of most beginners is that they tend to exaggerate the depth of tones. Actually, there is so much light coming from the sky, that even on the greyest day the darkest shadows have some reflected light and colour in them. This can be proved by looking at any subject through a hole, about 1 in. square, cut from a piece of black card. The deepest tone will be seen contrasted against the edge of the hole, Fig. 29. The sky is the source of light and must be kept paler than the middle distance of the picture. Beginners should not attempt complicated sky effects

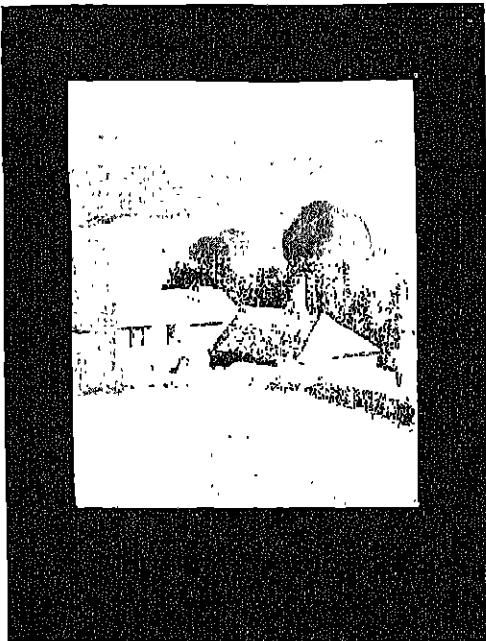


FIG. 29. TONES AS SEEN THROUGH BLACK CARD FRAME



FIG. 30. THE CENTRE OF INTEREST IS THE ONLY CLEARLY DEFINED POINT

until they have made sufficient studies of clouds to know just how to represent them effectively and with reserve.

The view finder is a useful means of realising pictures and how much background and foreground to include. Beginners usually do not allow sufficient foreground at the base of their sketches. The amount of foreground should generally not be less than roughly a quarter of the depth of the picture and probably not more than a third. It is difficult to say anything definite about this, because of the shape and position of the central object in the sketch.

It is important that the centre of interest in a sketch be well defined and treated as such. Actually, the centre of interest is the only clearly defined point to be seen when looking at the subject. The rest of the sketch should be gradually lost towards the edges of the picture, Fig. 30.

It is a good idea to think of a sketch in three planes: (1) sky, (2) middle distance, and (3) foreground. The amount of detail and contrast increases as the planes approach the spectator.

Teach the children to use plenty of water with their colours and to work from top to bottom of their paper. Teach them to:—

1. Work as quickly and as carefully as possible.

2. Work as broadly and as simply as possible.

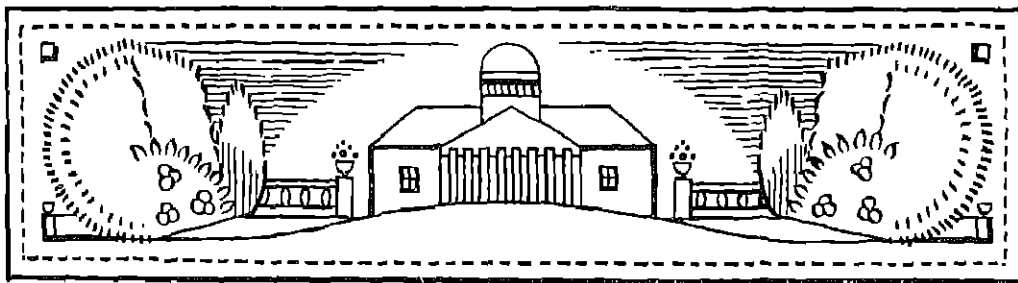
3. Work as wet as possible.

Colour will not redeem a badly drawn sketch. Even the most hasty sketch must have good drawing as its basis. If you have three half-hour periods for outdoor sketching, employ two for drawing, or monochrome work and one for colour sketching.

To illustrate the importance of drawing and accurate observation there is the story of the artist who drew a sleeping cow and showed the drawing to a country yokel. When asked to name the subject, the old man replied, "That be a dead cow." The artist was disappointed, and realising that his drawing was a failure, made another

attempt to represent a sleeping cow. The new drawing was shown to the same yokel who, on being again asked what it depicted, replied as before, "A dead cow." The poor artist was greatly disappointed, but he did not allow himself to be beaten. He determined to discover what it was that marked the difference between a live cow and a dead one. He spent many months in studying sleeping cows, until he was convinced that he could portray them satisfactorily. Then he made another careful drawing of a sleeping cow. Once more the yokel was shown the drawing and asked what it was meant to portray. This time the old fellow replied, "Why, he be a cow asleep!" And the artist knew that his months of careful study had not been in vain.

IV. SKETCHES IN THE PARK



For those who live in towns and big cities, there are to be found many interesting and excellent subjects for sketching, yet town dwellers readily miss and fail to appreciate the beautiful, well-kept open spaces to which they have free access.

Go into any park, and, provided you do not trample about on the carefully mown grass or do any other damage, you will be able to sketch away to your heart's content. Forget that you are in a town or city and try to appreciate beauty wherever you can find it.

When you begin sketching in the park, choose something very simple, such as the

corner of a pathway, or a shrub, a seat, a gate or a door. Do not attempt a wide expanse of complicated scenery or the whole of an artificial lake as the subject of your first sketch, or you will be tackling something that only an experienced artist can sketch successfully.

There are sure to be shrubs in the park and they will make excellent subjects for your first sketches. Select bushes that are interesting in shape, that is, not those that have been clipped into ugly, artificial shapes, but those that appeal to your sense of beauty by reason of the freedom of their growth and the happy arrangement of their outlines and

masses of light and shade. There are many lovely types of shrubs to be seen as a rule in parks, yet people pass them by, taking little or no notice of them because they are so commonplace. There are many types, such as the laurels, the hydrangeas, with their familiar pale blue and pink flowers and the rhododendrons with their beautiful flowers of various colours.

Choose your position in a quiet, less-frequented part of the park where there are few passers-by. Try to avoid sketching on any main pathway, or you will find it very annoying to have people passing by and most likely frequently obscuring your view. Take up your position some distance away from the shrub you intend to sketch, not less than about nine, or ten yards away, so that you see the leaves less clearly. Try to select a position where the light comes from the left. Do not sketch facing the sun, or the bush will be entirely in shadow, with no contrast of light and dark.

Take a good, careful look at the shrub and try to appreciate its mass formation. Note the pattern of the lights and darks. Notice the way in which the near parts project toward you and are seen in greater

detail with a stronger contrast of light and shade.

Make your first attempt in pencil, carefully roughing in the general masses very faintly, Fig. 31 A. Next, begin to give form to the sketch by suggesting the shadows. Take great care to convey a sense of the breadth of the whole. Half close your eyes when you look at the shrub. Forget the separate leaves and cavities for the time being and see the shrub as a mass, having no definite form with light and shade. Suggest the leaf-shapes as you will, but use them to convey a sense of growth and roundness. Do not attempt to draw each and every leaf. The most detail and greatest contrast of tone will need to be shown in the parts of the shrub nearest to you. Feel the roundness of the bush-form as you sketch. Lessen the amount of detail and tone contrast as you work away from the nearest point of the shrub. Leave the edges free and quiet in tone so as to give the impression of the roundness of the shrub melting into the background, Fig. 31B.

Sketch another shrub with pen and ink, Fig. 32. Rough in the foundation lines faintly in pencil (Fig. 32A) then work over that

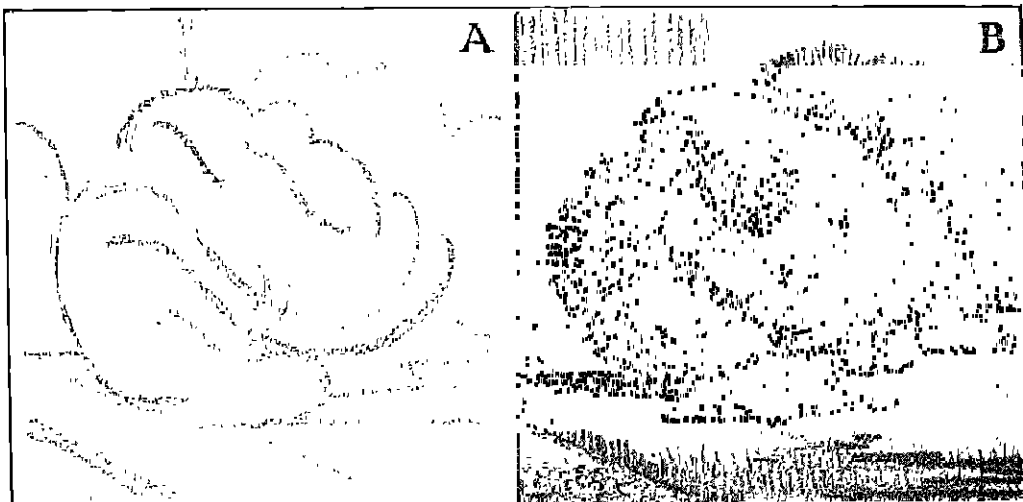


FIG. 31. PENCIL SKETCH OF BUSH

A. Light foundation.

B. Finished sketch.

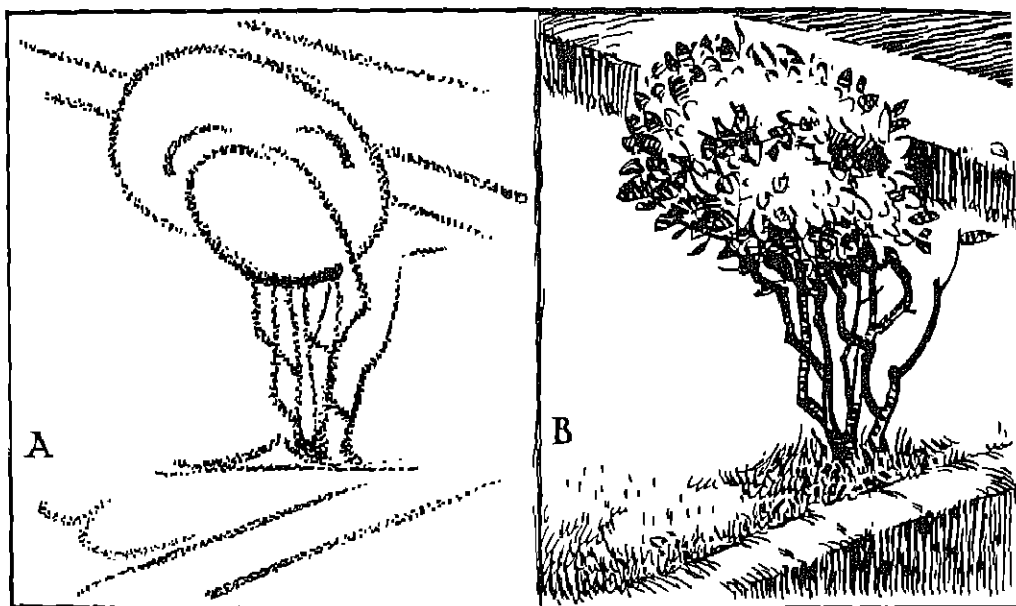


FIG. 32. PEN AND INK SKETCH OF SHRUB

A. Pencil rough-in of masses.

B. Finished pen sketch.

with your pen. Do not worry too much about the leaves, but treat the sketch broadly using the pen lines and touches to show the growth and form of the shrub. Work round the shrub. Begin somewhat vaguely, putting in a few touches to suggest the masses, then add the shadows,

Think well before you draw the lines, because once drawn, they cannot be erased. Draw boldly and with confidence. Do not be afraid of your pen—some people are: they regard the pen as a dangerous tool not to be trusted! Think to yourself, "It does not matter to me whether I am drawing a shrub or a pot, I mean to make it look round." Then use all your skill to give the shrub form. Make use of any particular leaves, here and there, if they will aid the expression of form and growth, Fig. 32B.

Try to appreciate pen sketching for what it is worth. It is based on the pen-drawn lines, but you must aim at drawing in such a way that there are no obvious lines showing in your sketch. This is not so very easy as one is usually tempted to draw outlines

rather than tones. Forget outlines! Try only to express form. Always think in terms of cubes, cylinders, pyramids and cones. Wherever it is possible, produce edges by means of contrasted tones, not by lines.

The shrubs will make interesting colour sketches. You can try roughing in the general masses with a very faintly painted line (Fig. 33A) such as a pale blue, or green. Sketching trees and bushes was dealt with in the last chapter on *Sketches in the Country*, so that it will not need to be repeated all over again. Try to see the shrubs as whole forms and paint them in the mass.

If the shrubs have berries on them, do not attempt to show each separate berry. Half close your eyes and notice how the berries fall into masses of colour. In painting the shrub, show these patches of colour, either by breaking in red, orange, or whatever colour the berries are directly into the foliage, or into patches of plain paper left for the purpose. In either case, break in the colour while the foliage is damp, but on no account must the general form

of the shrub be destroyed. Perhaps a few definite touches of colour can be put on the near parts of the shrub to show separate berries, but this will depend on the amount of their contrast with the foliage and the distance you are away from the bush. If necessary, you can always wash colour right over either the whole, or part of the sketch to tone the colours down, or to pull them together as a whole, but the colours must be allowed to dry thoroughly first. If you are painting flowering shrubs, or trees, such as hydrangeas, rhododendrons, laburnums or cherry trees, the same advice holds good. Forget the separate flowers; look for the masses of colour.

There are usually fine trees to be seen in parks and these make good sketches. In the spring there are beautiful flowering trees, among which are chestnut, plum, cherry and May trees. Then there are usually sycamores, rich golden-purple coloured copper beeches, oaks and many another type of tree.

Why not make a sketch of a seat—not with people sitting on it—if it is not too elaborate? Find a seat in a quiet part of the park and select a position in which to sketch it, where the sun shines from the

left. View the seat from a slight angle so that it makes an interesting picture, Fig. 34.

Before you begin to sketch, take a good long look at the seat and acquaint yourself with its shape as a whole, its perspective and the pattern of its shadows. Notice the details of its construction, such as the way the part on which people sit and the back are connected with the supports. Then faintly rough in the mass and give it correct proportion and perspective. Next, you can include some background in the sketch and put in enough foreground to give position to the seat. Indicate the different planes of the seat, such as the upright sides, the horizontal planks on which to sit, and the sloping back, by the direction and nature of your pencil strokes. You can also make sketches of seats with pen and ink and with water colours.

In the pen and ink sketches you can try to show the texture of the seats, but keep the light planes fairly free from pen work. When you sketch seats in water colour (Fig. 35) half close your eyes and try to see the general colour and tone of the masses. For example, in looking at the back of a seat, try to see the general colour without the many breaks of colour, and paint it as



FIG. 33. WATER COLOUR SKETCH OF BUSH

A. Foundation of pale paint.

B. Finished sketch.

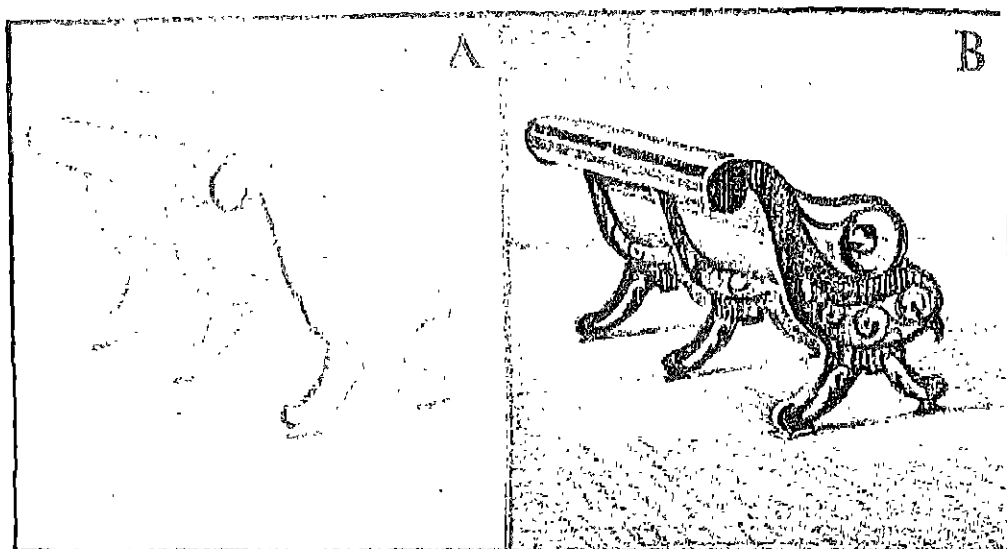


FIG. 34. PARK SEAT SKETCHED IN PENCIL

A. Faint foundation.

B. Finished sketch.

a tone of a certain colour so as to express the essential flatness of it. It is best to represent any flat surface as an even toned wash. Changes of colour, especially contrasted colour, such as orange and blue,



FIG. 35. WATER COLOUR SKETCH OF SEAT

tend to rob the representation of a flat surface of its flatness. Take, for example, the wall of a house. It is half red brick and half grey cement and, being flat, is receiving the same amount of light. To show the wall with the red and grey in contrast to each other would tend to break the flatness of the wall. The best way to show the wall would be to keep the red of the bricks and the grey of the cement nearly similar in tone—that is, lightness. The evenness of flat walls and surfaces is strikingly proved during sunsets. Then, the whole surface is bathed in a red glow and the contrast of surface colours, such as of brick and cement, is negligible. Sunshine has a somewhat similar effect on all surfaces and tends to pull contrasting colours together by its yellowness. Thus, on a sunny day, greenery over a brick wall would lose some of its power of contrast against the red bricks by the flood of mellowing yellow light.

As has been said in a previous chapter, one must never take for granted the fact that such an object as a tree is green, for it is usually any other colour but pure green. Lighting, time of day and distance all influence colour in their different ways.

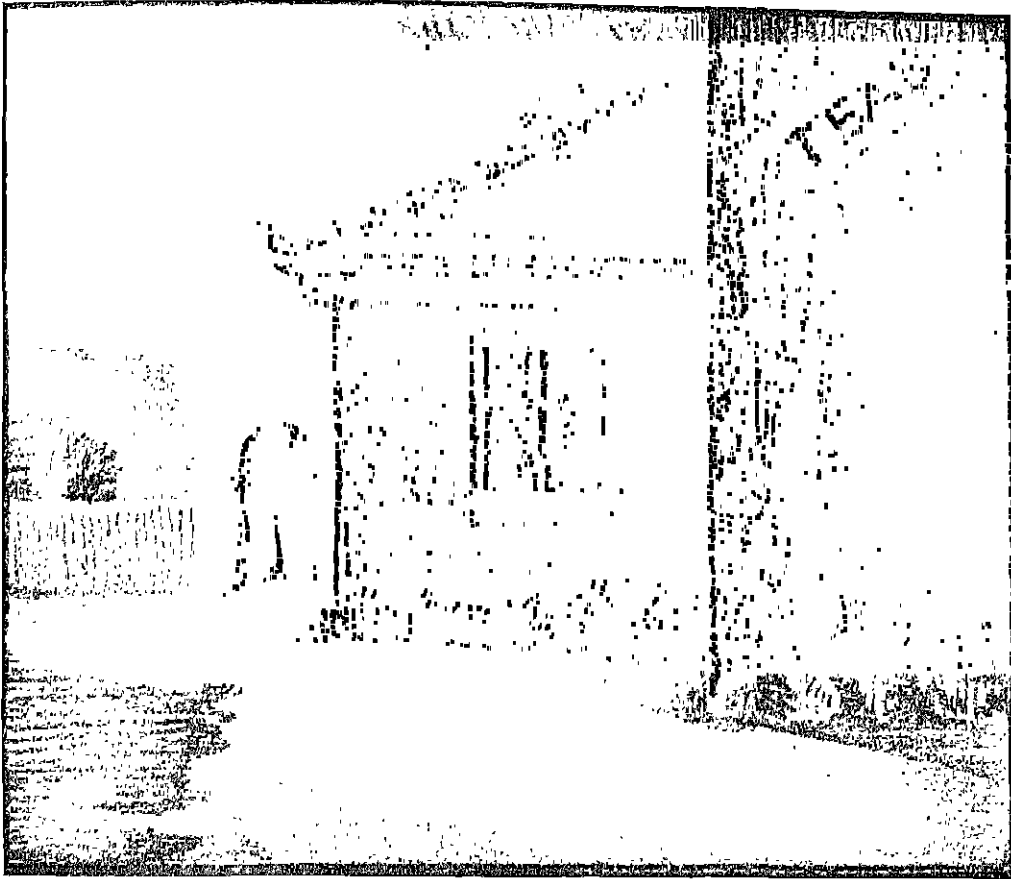


FIG. 36. TEA KIOSK SKETCHED IN PENCIL.

Try to forget that grass is green and that bricks are red. Look for variety and beauty of colour where and when you can.

Tea kiosks are to be seen in most parks, or public gardens. If they are fairly simple structures, without too many fantastic elaborations, they will be worth sketching, Fig. 36.

Possibly there is a park keeper's lodge that will serve as another subject for a sketch, Fig. 37. Choose the best view of either building with regard to their lighting and your position. Remember that the most interesting effects of light and shade are seen when the light is shining from the left, or right of the subject. If the sun is shining at all brightly, it should not be

difficult to get a shady place in which to sit and sketch.

Include sufficient sky, distance and foreground to make a pleasing picture, using your view finder as an aid. Be careful to draw the proportions and perspective truthfully. Do not forget frequently to compare your efforts with the original so as to be able to detect any faults of drawing, or colour.

There are many other suitable subjects to be found in parks, as a rule, such as shelters, walls and bridges. The latter are always interesting subjects to sketch. There is something fascinating about a bridge; perhaps it is the idea of it crossing over water, or the rich, dark shadow to be seen underneath the arch of the bridge. Do not



FIG. 37. PARK KEEPER'S HOUSE SHOWN AS A WATER COLOUR SKETCH

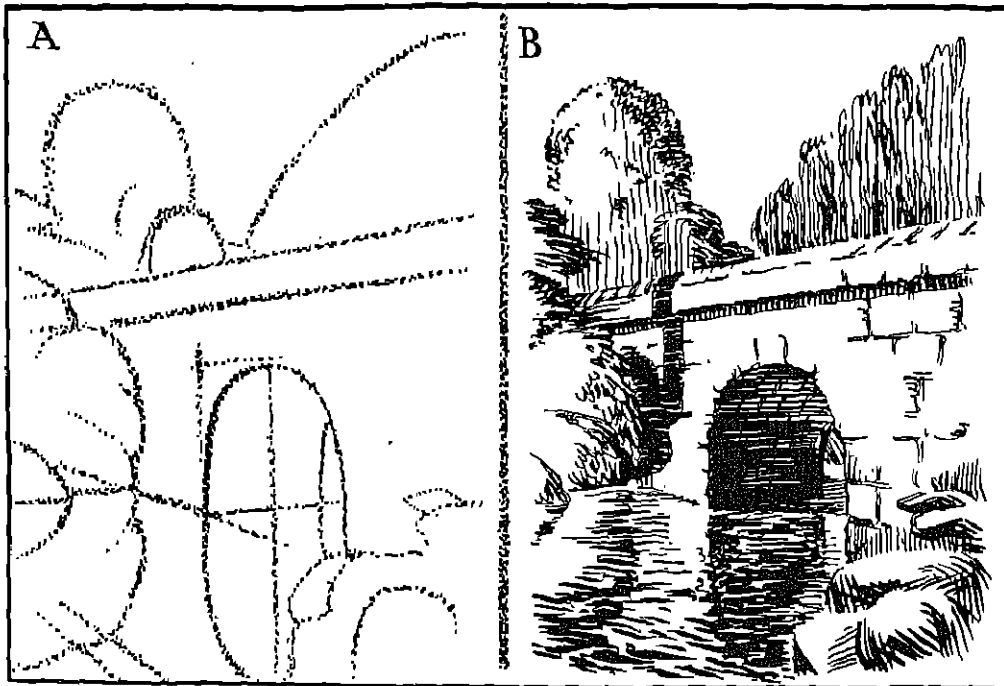


FIG. 38. PEN AND INK SKETCH OF BRIDGE

A. Faint pencil foundation.

B. Finished pen sketch.

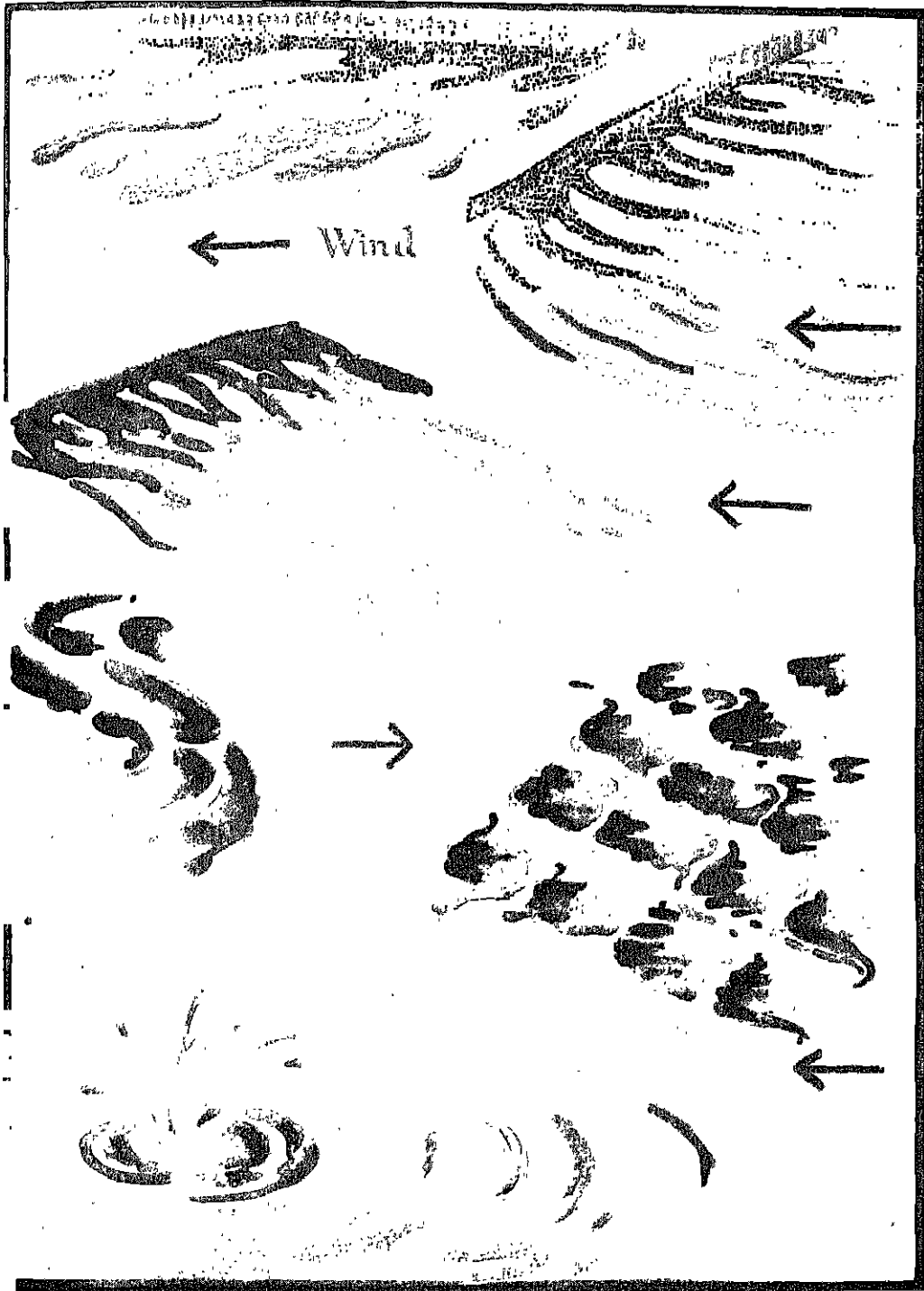


PLATE XI
PENCIL AND WATER COLOUR SKETCHES OF WAVE PATTERNS ON WATER. THE WIND DIRECTIONS
ARE INDICATED BY ARROWS

attempt to sketch the bridge if it is a very elaborate, ornate, iron one.

In sketching a bridge (Fig. 38) notice the general form, the lines of perspective and the shadows. Notice the reflections in the water. Use your view finder to select a pleasant picture. Include plenty of foreground, some water and some bank. Arrange the bridge in the picture so that it does not appear exactly in the centre. When you are sketching, try to see the broad mass shapes of the bridge, Fig. 38A. Take care to draw the perspective correctly. Be careful to draw upright lines upright. It is very unpleasant to see a drawing of such an object as a house, or a bridge with the uprights drawn aslant. Keep the foreground quiet and simple in treatment.

Perhaps, at this point, while we are on the subject of bridges, you had better learn something about sketching water. It will be a good idea to make some fairly rapid studies of water in pencil, pen and water colour.

A good place to sketch, when you are making studies of water, is along the bank of a lake, or stream, where there are dark reflections to show up the wave patterns.

Watch the water carefully before you begin to sketch. Notice the interesting patterns of the waves, Pl. XI. See the water as a level surface broken, or decorated by waves caused by wind, or water current. When you make these studies, note down the direction of the wind or current on them and notice how the wave patterns are affected by either of these, Pl. XI.

When you are sketching water, think of it as a level surface, like a mirror, with a certain surface pattern, and in perspective. The laws of perspective apply to the wave patterns. They appear to lessen in size as they recede into the distance where they merge together.

To sketch water in pencil, or pen and ink, after watching the movement and pattern of the waves, first of all rough in the shapes of the tones. It is important that you limit large and strongly contrasted detail

to the near foreground if you are showing a big expanse of water. Looking at a large sheet of water, such as a lake, you will notice that it gradates from pale in the distance down to dark, broken here and there by flicks of light and tone in the foreground. Insist on any horizontal lines to add to the suggestion of flatness.

Next, fill in the various tones, from light to dark. Notice the delicate, fluid contrasts of tone and the rich, juicy, deep tones. Observe the edges of the tone shapes; they are often darker than the inner masses. This is due to the trough formation of the wave valleys. The bottom of the valley is one tone; it darkens up the sides until it reaches the crest of the wave and vanishes in the light.

Leave plenty of white paper, drawing in the tone shapes of the valleys of the waves. These should be well-defined flattish patches of tone with strongly contrasted, yet softened edges to the waves. You must be very observant, for the wave shapes change rapidly.

When you are sketching water in colour, begin by roughing in the tone shapes. This can be done faintly in pencil, or with pale paint. Next, flood on as a basis some pale general colour—the pale paint foundation lines must be dry before this can be done—probably green-yellow, or olive-green. Then, rapidly note the palest colour and lay it on in its place while the first wash of colour is still wet. Draw the edges first with drier paint, then fill in the centre masses. Build up the tone pattern of the waves from pale to dark, laying drier colour on wet colour with a brush that is not dry.

Do not spend too long over each study. At all events, it is important to work wet and crisp, leaving some flicks of light here and there to add sparkle and life to the water and striving to make it look wet.

Water echoes the prevailing colour and tone of the sky. It adds colour and tone to the reflections in it, such as blue, green or olive. It also reflects light on to overhanging branches of trees and the arches of bridges, Fig. 38B.

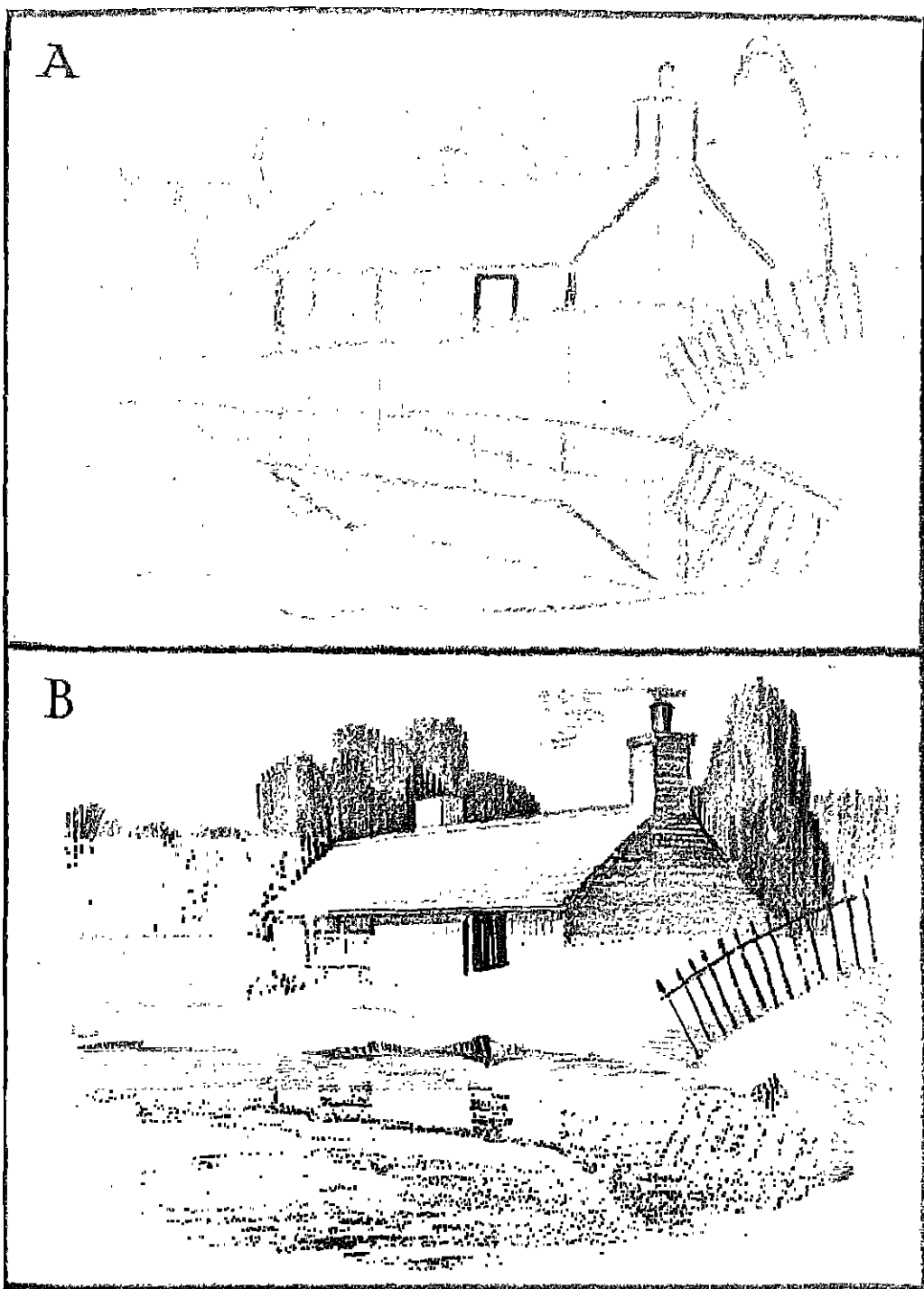


PLATE XII
MAKING A PENCIL SKETCH OF A HOUSE REFLECTED IN A POND

A. Faint foundation.

B. Finished sketch with darker tones and shadows added.

This brings us to reflections in water. Study the reflections of objects in water. You can make some sketches of them, but they must not be too difficult. Try sketching the reflections of reeds or rushes and posts in water, Fig. 39.

When you are sketching reflections (Pl. XII), take particular notice of the general tone of the reflections as compared with the objects reflected. Notice the depths of the bank and the depth of the reflection

same amount of bank or ground running down to the water's edge in the reflections.

Try to visualise the surface of the water as a mirror-like plane receding to the horizon, with the land, trees and other objects built upon it. Use this imaginary base plane as a foundation for your calculations of the depth of reflections.

Sketch in the edge of the water and the bank. Take, as an example of reflection, a house on the bank a distance back from the

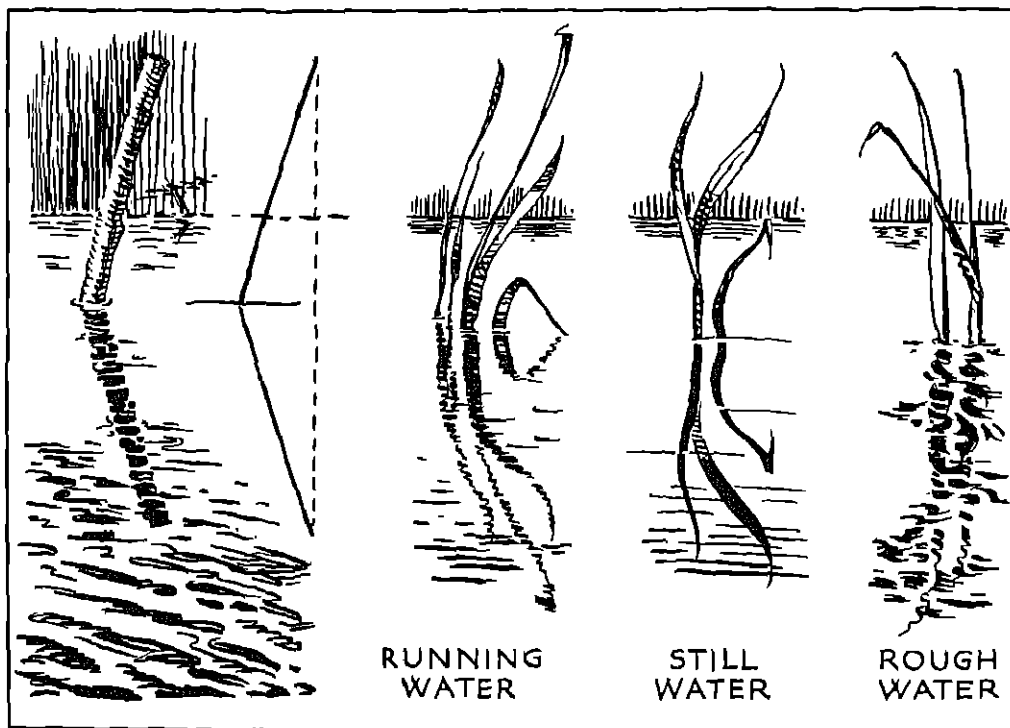


FIG. 39. REFLECTIONS

of the bank. Notice the edge of the water where it touches the bank. Sketch the object, or objects, upside down. Draw them as such with regard to proportion and perspective, but remember that owing to the fact that they are on a much lower level you will not see so much of them as on the bank. Chimneys on the other side of houses will disappear in the reflections. Trees behind houses will also disappear in the reflections and you will never see the

water's edge. Very faintly, in pencil, or pale paint, note down any lines or points that show in the reflection exactly underneath the originals in a vertical direction, such as the upright edges of the walls, the door and chimney stack and the apex of the roof. Then, carefully observe the depths of the parts of the house that are visible in the reflection, measuring from the water's edge. Draw the reflections correctly and very faintly at first, then after carefully

noticing the original, add the tones and the edge lines. If the latter are broken by waves, notice the pattern. Keep the reflections simple and broad in treatment. Notice any horizontal lines, such as those of waves, flicks of light, patches of weed, or shadows cast on the water and make use of them to suggest the surface of the water. Horizontal lines breaking across the reflections, light against dark, or the reverse, will help to give the sense of the level surface of still water.

Figures will add interest and life to your sketches containing trees and houses, so that it will be a good idea to make some rapid simple sketches of people you see about you. In the park you will see people sitting, walking and running. Sketch them as they rest, play games and work. Do not let them see you sketching them, or they may be embarrassed. Try to catch their natural poses.

It requires some amount of careful practice to be able to draw the human figure reasonably well. Firstly, you must know how to express its form and the movement of its limbs. That is the structural side of the drawing. Secondly, you must try to express the character of people in your sketches. That is the spiritual side of drawing.

Begin by making quick studies of people, rough sketches that are little more than suggestions of masses with their positions, form and light and shade. Do not worry about making finished sketches, or about intricate details of face and hands. Look for the masses—head, body and limbs. Consider masses first, planes or surfaces next, and lines last.

The three main masses are unchanging—head, chest and pelvis. See them as blocks, Fig. 40. Think of them as being connected by one line—something rather like a wasp's body. Notice how they are balanced one over the other. They are rarely seen to be balanced symmetrically one over the other and never when the figure is in action. They may be twisted horizontally or backwards and forwards. The three block masses are connected

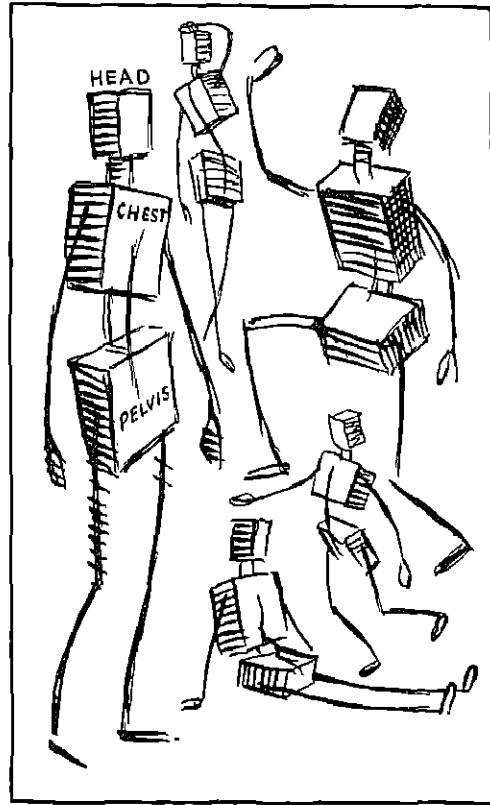


FIG. 40. THE THREE MAIN MASSES OF THE HUMAN BODY

and their movement is limited by the spine which is almost the centre, the axis, of the body.

The head block may be thought of as a cube having the back and front oblong in shape, and the sides square in shape, Pl. XIII. The base of the ear lobe and the base of the nose form a line at right angles to the vertical middle line of the face. Think of the face as being carved from such a block and capable of being seen in perspective. The chest block is built up around the rib cage, conical in shape, flattened in front and having the arms attached to the shoulders. The pelvis block is the mechanical axis of the body and is somewhat box formed. It is the fulcrum for the body and leg muscles.

When sketching figures notice the balance of the masses. In standing and most action

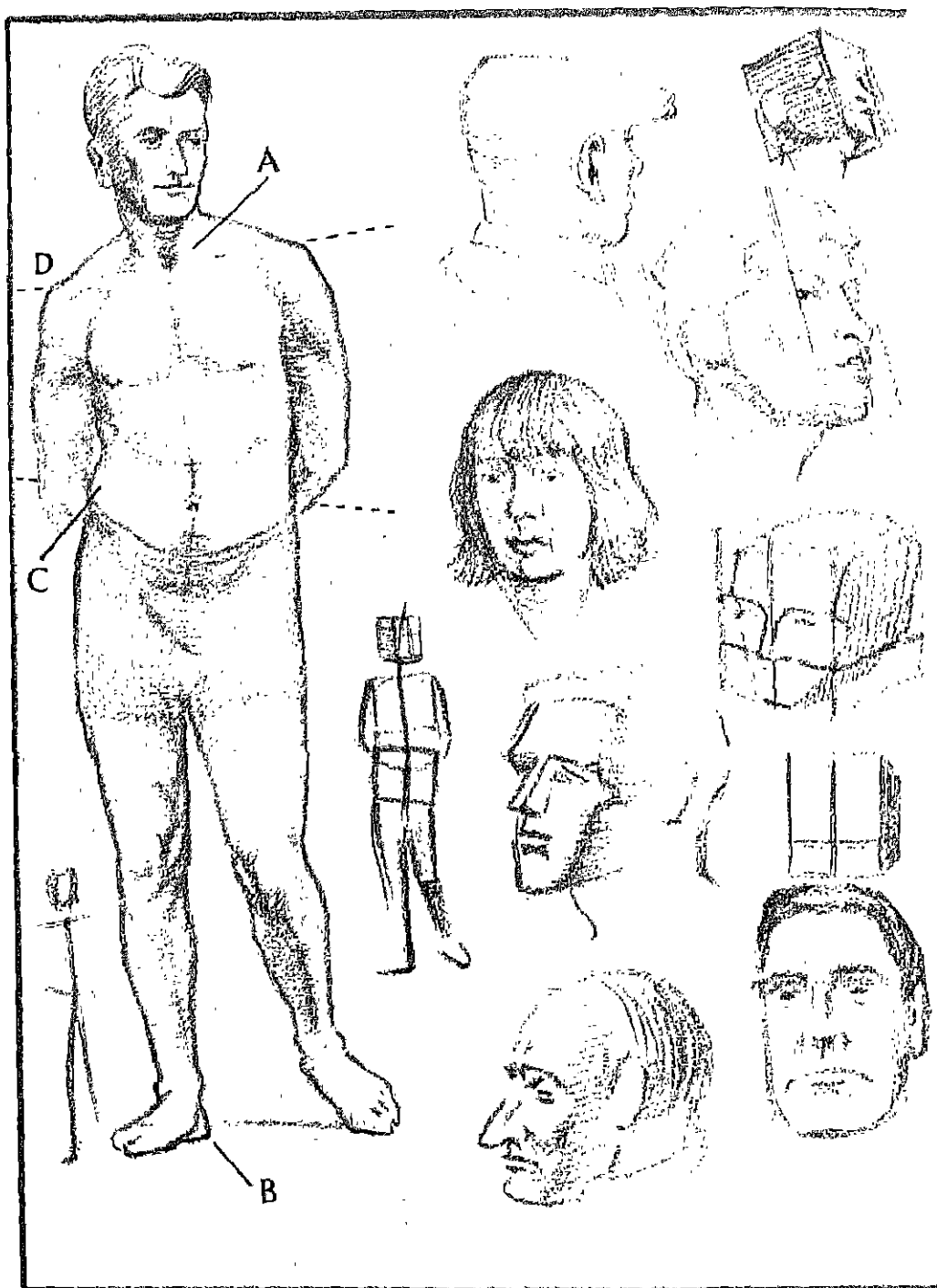


PLATE XIII

PENCIL SKETCHES OF FIGURE AND HEADS. HEADS SHOWN AS SUGGESTING BLOCK SHAPES

- A. Pit of neck balanced over the heel of the weight bearing leg, B.
- C. Hip of weight bearing leg forced up.
- D. Corresponding shoulder dropped.

poses, where the body retains its own balance, the pit of the neck, A, seen poised over the heel of the weight bearing leg, B, will afford two points on which to base the rest of the pose. Notice the central rhythmic line of the figure, the slope of the shoulders and hips. The balance of the figure will force the hip of the weight bearing leg up and the corresponding shoulder down, Pl. XIII.

Make your studies carefully, noting the way in which clothes fit the figure, Fig. 41. Note such things as folds of sleeves and trousers, the angle of hats and the way in which skirts hang, Pl. XIV. Calculate the main proportions of the figures—top of head



FIG. 41. HOW CLOTHES FIT THE FIGURE

to pit of neck, head, head into height of figure so many times, half-way point of figure, width of pelvis and shoulders, length of arms and legs, Pl. XIV A.

When you come to sketching figures in colour, note the main colour shapes. The head and hands—perhaps legs as well—flesh colour; the coat, shirt and trousers; the blouse and skirt; legs, boots or shoes, hair or hat. Notice the patterns of light and shade. The face has its own pattern of shade; viz., the eyes, at the base of the nose, the mouth and under the chin. Always be thinking in masses—cubes and cylinders—and in simple light and shade.

Try to get some feeling and expression of character into your figure drawings, such as will show a youth's sprightliness, a policeman's upright pomposity, a tramp's ragged poverty and an old man's bent-backed age. You will need to be observant and quick, for poses change rapidly unless the figures are seated.

There are several other park visitors it will be good practice to sketch. They are the swans, ducks and other water birds. They are to be seen in most parks where there are lakes.

The water birds provide examples of both beautiful mass shapes and beautiful colours. They are not easy to sketch, because they are rarely seen still; they are continuously gliding here and there on the water, or walking about round the edges of the lakes.

As with figures and animals, it is best to make careful, rapid studies of the birds, treating them as broad, simple masses. Then, after you become more acquainted with their forms and characteristics of pose and action, you will be able to make more highly finished sketches of them, drawing partly from observation and partly from memory. It is best not to approach too near to the birds so as not to disturb or frighten them.

You will want to make sketches of the swans when you see them because they are so graceful and beautiful, Pl. XV. See them as a whole, a somewhat elongated egg-shape that is very beautiful in its simplicity.

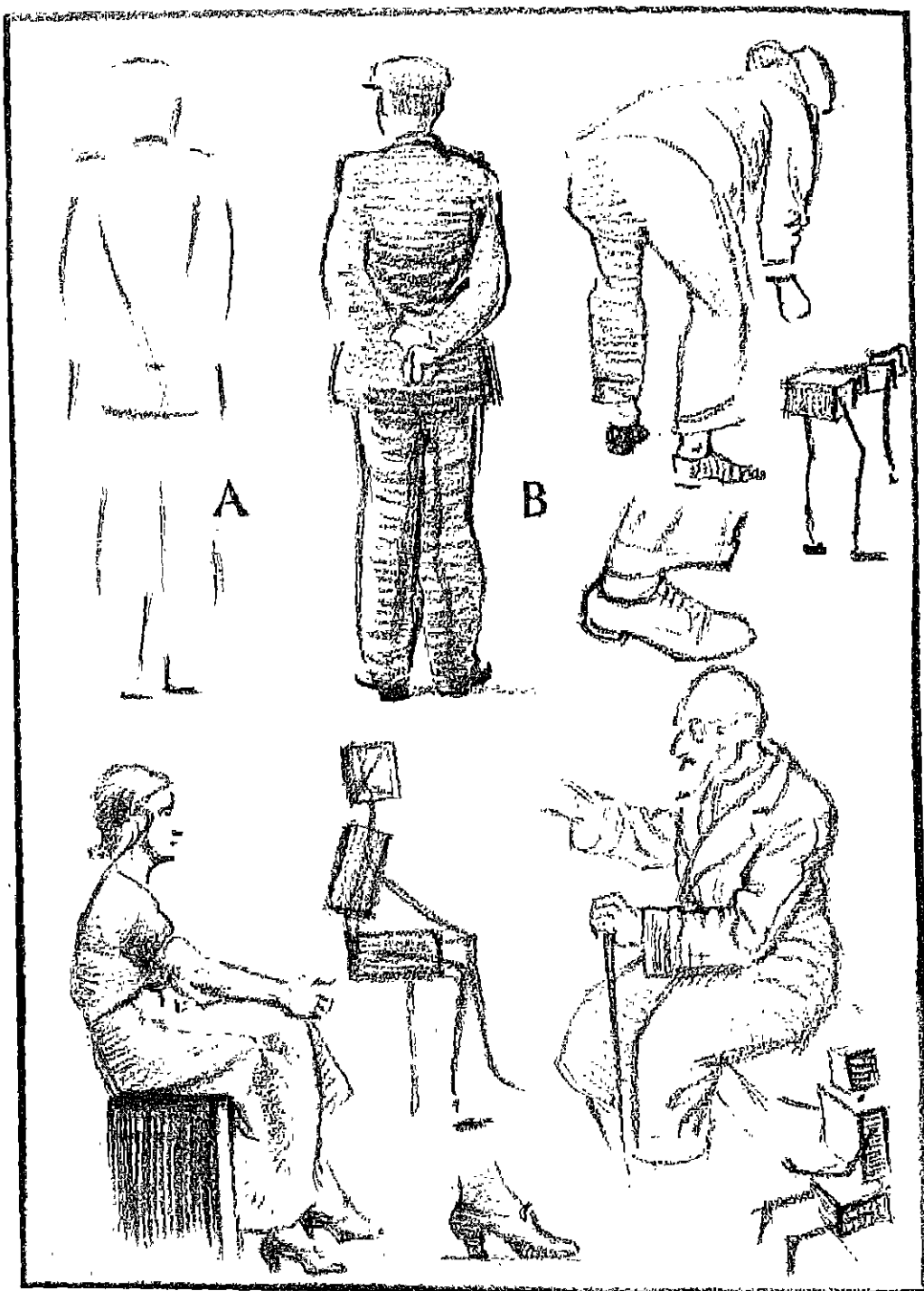


PLATE XIV

RAPID PENCIL SKETCHES OF FIGURES

A. Main proportions of figure suggested.

B. Finished sketch.

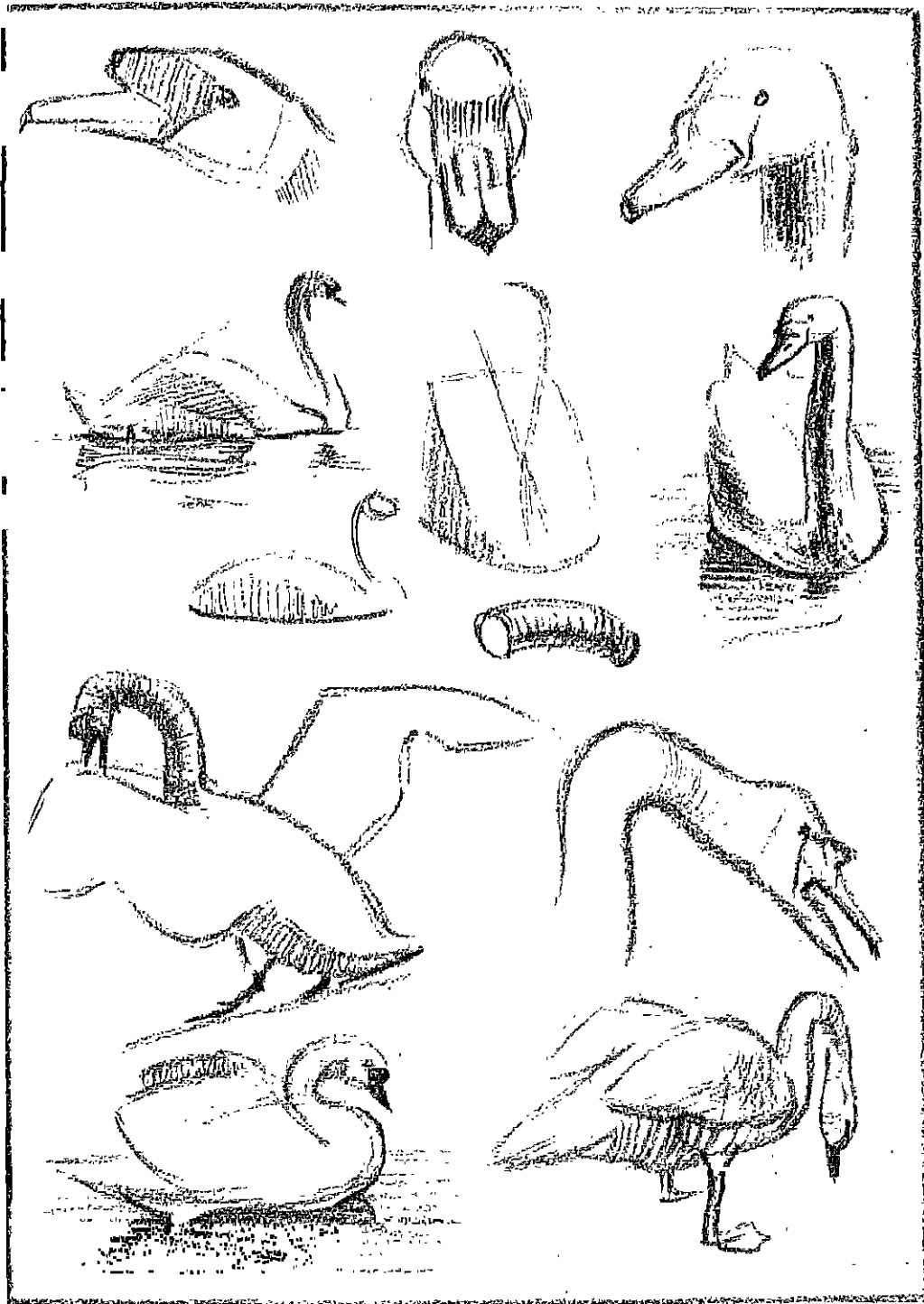


PLATE XV
RAPID PENCIL SKETCHES OF SWANS WITH SIMPLIFIED MASS SHAPES

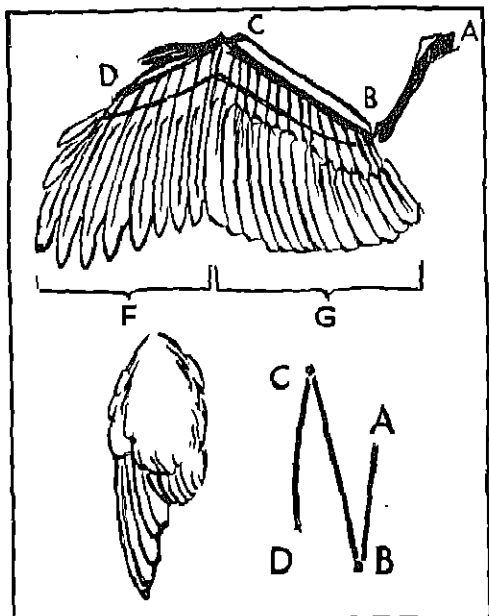


FIG. 42. BIRD'S WING BONES

A-B, Humerus.
B-C, Radius.
C-D, Hand.
F, Primary quills.
G, Secondary quills.

The supple neck grows from its fore-end, and the tipped up, pointed tail from the opposite end. Notice the way in which the head is balanced on the neck. Note the shape of the beak and how it grows from the head. Take notice of the way in which the wings are folded close to the body. In anger, the wings are raised like sails at each side.

Observe your subject carefully before you sketch. Make your first studies in pencil, looking for the simple mass forms. There is no bright colour about the white swan except for the orange-red beak and legs. There may be some reflected colour in the shadows, which will otherwise be bluish. Australian black swans, in direct contrast to the white swans, are to be seen in some parks. These are rusty black in colour, with a red beak.

The ducks (Pl. XVI) are altogether more fussy than their graceful relatives, the swans. Sketch them first in pencil. Notice their mass form,—a dumpy, pear-shape.

Observe how the neck grows out from the body, the head mass and the beak. Note how the wings are folded against the body in rest. You will have little opportunity to study the wings spread out in flight.

The wings of birds are difficult to understand until you realise that they are boned and jointed in a manner similar to the arms of a man, Fig. 42. Beginning at the shoulder is the humerus (Fig. 42 A-B) running back to join the ulna and the radius (Fig. 42 B-C) which points forward to where it joins the hand, Fig. 42, C-D. The joint B (Fig. 42) is hidden when the wing is folded in rest, but it is important to show it when the wing is spread out because it gives the power of forward and backward movement to the wing. The feathers of the wing fall into two main groups, those growing from C-D (Fig. 42) are the primary quills (Fig. 42 F) and those growing from B-C (Fig. 42) are the secondary quills, Fig. 42 G.

Notice the action and support of the bird's legs if it is walking, Fig. 43. They are jointed like the legs of an animal, Fig. 43 A-B, B-C, C-D. Although the joint B (Fig. 43) is hidden in the feathers, it is important to realise its existence. It gives the necessary spring to the leg. The joint C (Fig. 43) does show.

There are several types of ducks to be seen as a rule on the lakes of most parks. The drakes are beautifully coloured. There is the Mallard with its bronze-green head

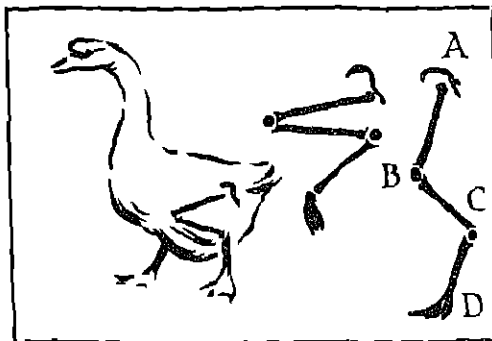


FIG. 43. BIRD'S LEG BONES

A-B, B-C, C-D.
B, Joint hidden in feathers.
C, Joint shows.

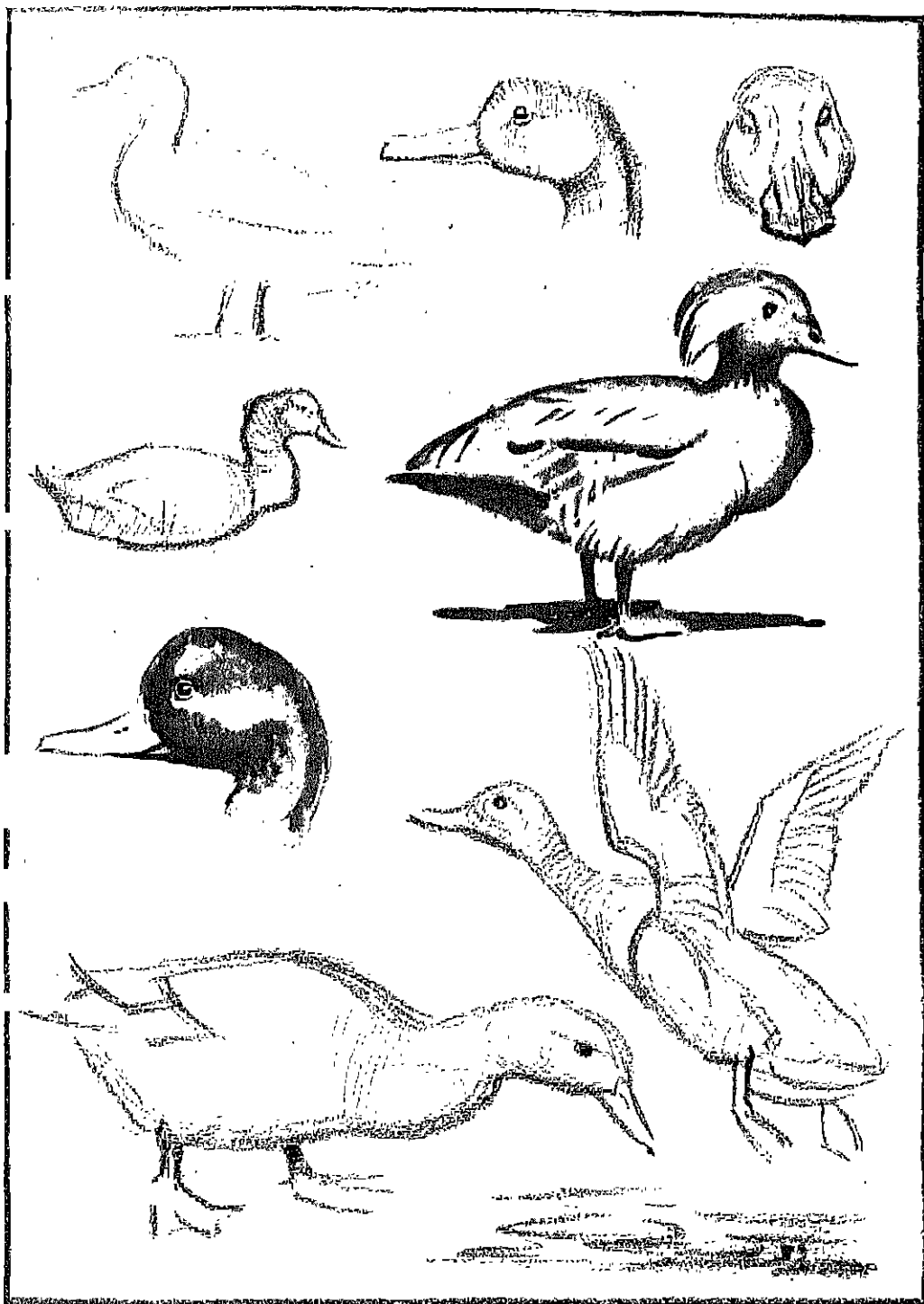


PLATE XVI

PENCIL AND WATER COLOUR SKETCHES OF DUCKS WITH SIMPLIFIED MASS SHAPES

and yellow beak, with a clean white collar, reddish breast and touches of white and violet on the wings; then there is the Teal with its orange-red and green head with bars of rich green on its wings; and also the Widgeon with its orange and yellow head with a grey body. There are other small water birds, such as Coots and Dabchicks.

In sketching the birds, try to express the beautiful simplicity of their stream-lined bodies. Watch the bird carefully, then, when you are convinced that you have its form and pattern of colour fixed in your mind, seize on a moment when it is fairly still and very rapidly and as correctly as you can, rough in the position and shape of the main masses, the body and the neck and head, noticing the poise of the latter. If the bird is walking, make the legs look as if they are supporting the body. If the bird is floating, take particular care with the water line round the body. This will add to the expression of form in the body mass.

In colour sketches, keep the colours very broad and the treatment simple. All the time be thinking in terms of mass form—cubes and cylinders—and work “round” your drawings, using shading to express form and show direction of mass plane by your pencil strokes or pen lines.

Later on it will be nice to make a little picture, such as part of a pathway, with some lawn, or a bank on one side and with some shrubbery, or trees on the other. It must be a very simple picture. Use your view finder to help select a pleasant picture. Have plenty of foreground and choose a view point from which the path is seen to lead to somewhere within the picture. This must not be on a central line. The path must not cut across the picture from left to right so that the sketch is divided into two parts. The masses of light and dark must be so balanced that they do not cut the picture into halves, either vertically, horizontally, or diagonally, Fig. 44.

Keep your treatment broad. Think out the masses and try to express them as well and as simply as you can. It is the broad



FIG. 44. THE ARRANGEMENT OF A SKETCH

form that is most telling, not the details. If the general drawing is wrong, not even the most carefully drawn details will compensate the inaccuracies of perspective and proportion.

Teaching hints.—A park will provide many varied and suitable subjects for sketching, such as those mentioned in the chapter on shrubs, trees, buildings, figures, birds and water. The sketching of trees and houses was dealt with in the previous chapter and will still hold good.

A certain amount of common sense should be exercised to assist the choice of such subjects as keepers' lodges, tea kiosks, seats and bridges with regard to their being suitable for sketching. It should be

unnecessary to add that they will not be suitable if they are definitely ugly. However, so much depends on the view one takes of the subjects and on their lighting, that on some particular day, or time of day, a positively appalling scene will appear to have a charm of its own when viewed from a certain angle. One is thus reminded of what was written in the opening chapter, "The subject is unimportant. . . . Look for and try to express impressions."

Teach the pupils to sketch their personal impressions of scenes—with the addition of truthful drawing. Do not fail to make them understand that they are not cameras and that it is not desirable for them, as artists, to attempt to compete with cameras in the rendering of each and every detail. Teach them to "think big," that is, in terms of broad masses and general forms. Most objects, such as trees, figures and buildings have one, or more of the basic forms—cubes, cylinders, pyramids, cones and spheres. It is as well to remember that objects seen at a distance are recognisable from their general forms and not by their details.

The study of figures seems to be a necessary and desirable part of sketching practice. Figures always add life and extra interest to any sketch, but care must be exercised with regard to their scale and placing.

To be able to draw figures well, some knowledge of the bone structure and disposition of the main masses of the human body is necessary. In art school training this is obtained by drawing from the nude. It will be sufficient for the children to be shown that the human figure consists of several well-defined masses. There are the two jointed poles giving support to the body—the *legs*. These are attached to each narrow end of a matchbox form having its largest faces to the back and front—the *pelvis*. From this grows a flexible tube—the *spine*. This balances a block—the *head*—and sus-

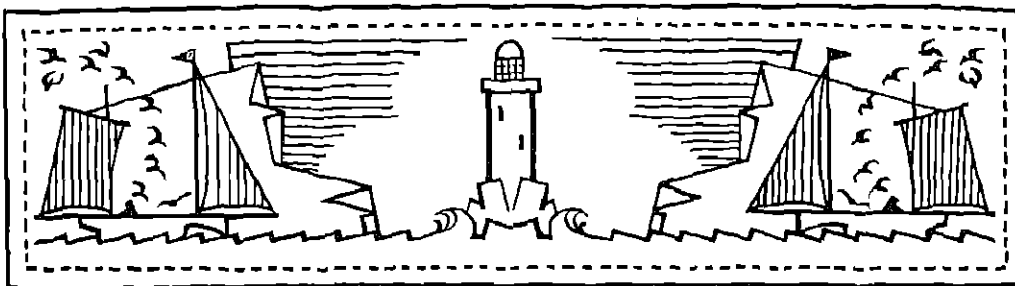
pended from it, between the block and the lower matchbox is another larger matchbox form—the *chest*—from which are suspended two smaller jointed poles—the *arms*.

If it is possible for figure drawing to be extended to the indoor classes, it will be excellent practice, not only in the study of rhythm of movement and beauty of line and proportion in the figure, but also in the study of people and character. The draping of clothes can be studied in greater details. Limbs can be attempted more fully in all their difficulty of form and action. Poses should be very simple, with the arms down and of not longer duration than ten minutes.

The water birds afford examples of beauty of form, line and colour. There is a wonderful sense of economy of line to be seen in the body of a bird. The wings and legs have been discussed as these are the usual difficult points in bird drawings.

It is always helpful to have some knowledge of the construction, or action of a subject, so as to be able to draw intelligently. It is not enough to teach children to draw what they see only. An understanding of the whys and wherefores of form and action must be part of the training. Some teachers think it sufficient to correct the drawings, showing how this and that should, or should not be done. This is not complete enough. Young people want to know "why" as well as "how." The teacher should try to teach "why." Surely, for example, it is more reasonable to demonstrate that a tree is such and such a shape because of the arrangement of the branches, rather than because it is merely seen to be a certain shape. Sometimes the eye deceives. Again, if it is known that clothes take on certain shapes and are draped in a certain way because of what is happening to the figure underneath them, it will not only add reason to those shapes and drapings and render them more understandable, but it will also result in a more tangible form of expression.

V. SKETCHES AT THE SEASIDE



It is fine fun to sketch at the seaside. There are so many exciting things to record in your sketch book. There are boats—they are always attractive—sturdy fishing boats and graceful yachts. Then there are majestic cliffs, often so tall that they dwarf large objects at their feet, impressing you with the might of nature. There are people to be seen—holiday makers and fishermen. And in

addition to a host of brave subjects for sketches, there is the sea itself.

Probably, one of the first things you will want to do, is to make sketches of boats. Let your first boats be simple ones, such as rowing boats. Make your start with pencil.

Choose some easy-looking boat lying on the beach. Select a position from which you will view the boat partly from one side.

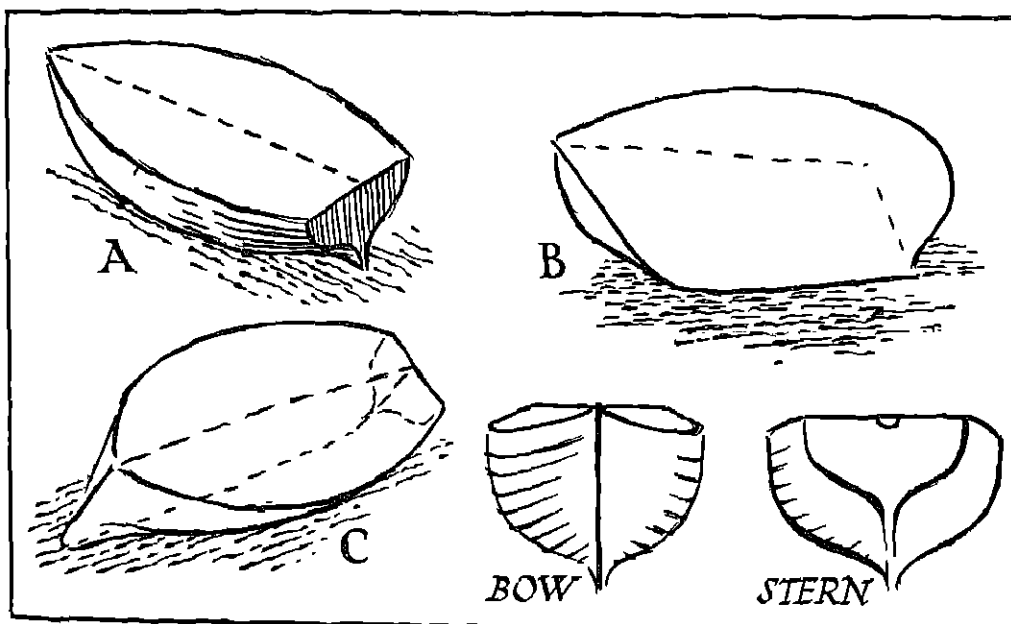


FIG. 45. BOAT FORMS IN PERSPECTIVE

- A. Keel line hidden underneath side of boat.
- B. Edge of the hull seen as a rising curve.
- C. Imagined central lines of hull-shape.

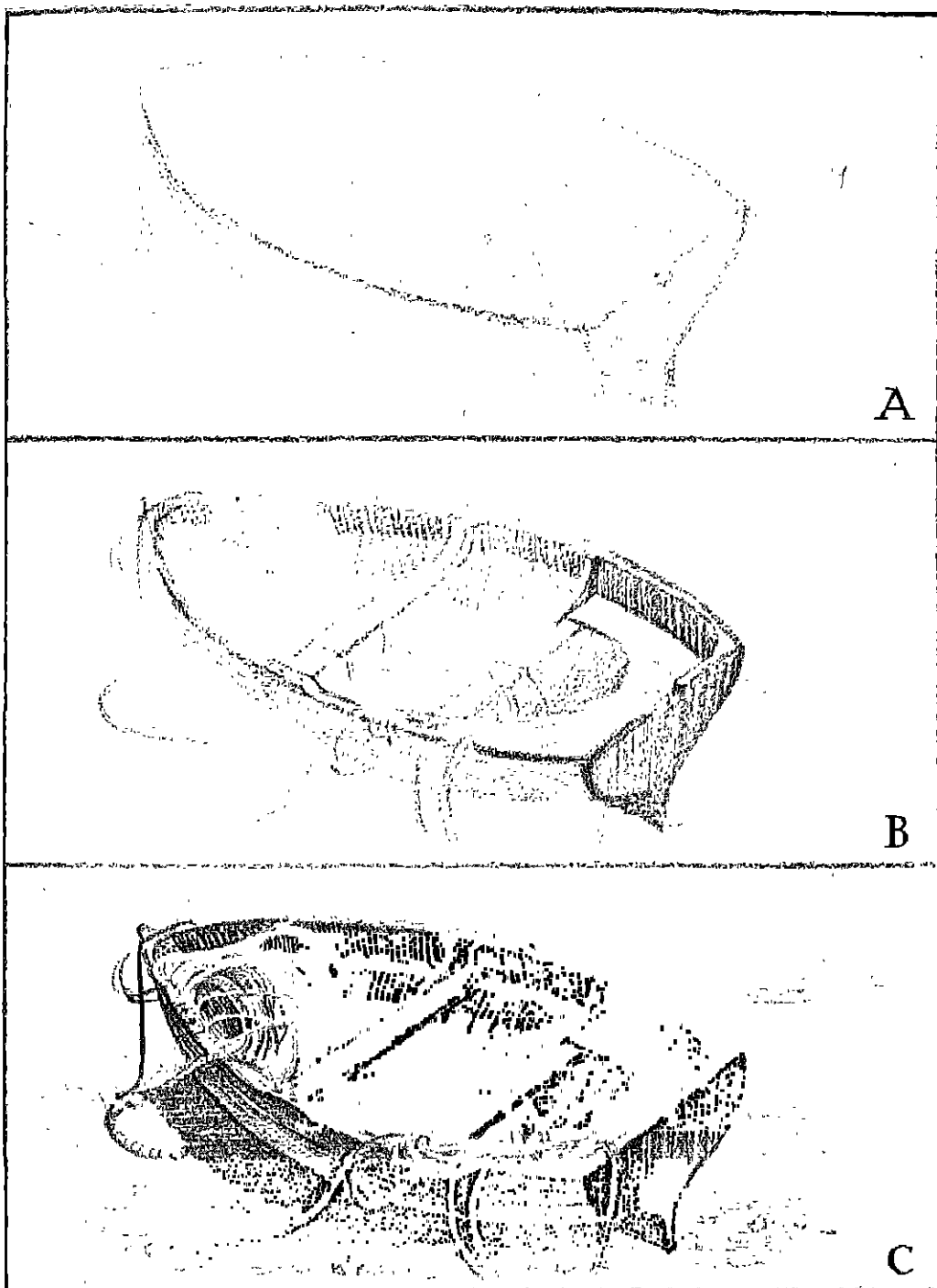


PLATE XVII
PENCIL SKETCH OF A ROWING BOAT

- A. Faint foundation.
- B. Form suggested by shading.
- C. Finished pencil sketch.

In the first sketch, see the boat as a whole, something like a solid block with a certain shape. Notice its perspective and how it is resting on the ground. When the boat is seen lying on its near side, the side will belly out and partly hide the keel line. The near edge of the hull will form a sagging line and the far edge a rising curve, Fig. 45A. Or if the boat is seen lying on its far side, the keel will appear as a straight base line and the near edge of the hull as a rising curve. The stern will be seen to curve down, then in and down to the keel, Fig. 45B. If you are facing the fore part of the boat, notice the upright post of the bow and the angle it makes with the keel running back in perspective along the bottom to the stern, Fig. 45C. If you are looking at the boat from the opposite direction, notice the flat shape of the stern and how the lines swell out in the direction of the bow, Fig. 45A.

When you are sketching a rowing boat, first of all faintly rough in its general mass

form. Try to imagine a section cut through the hull, from bow to stern. Each half of the boat would be alike. Try to feel the symmetry of its form. You can very, very faintly suggest this section if it will help you to draw the boat more correctly. Its lines will run along the keel, up the bow-post straight back to the centre of the stern and back down to the keel again, Pl. XVIII A.

Take particular notice of the top edge lines of the hull as they curve away in perspective. Notice how the lines of the planks of the side radiate from the bow-post down and back along the side to the stern. Try to feel the roundness of the bulk of the hull and make use of the plank-lines to express the form. Feel the hull swelling out from the bow and the stern as well as from the keel to the gunwale. Add the shading to give form to the sketch and make use of your pencil strokes to show the swell of the hull and direction of the planks. Make use of any accidents of light and shade,

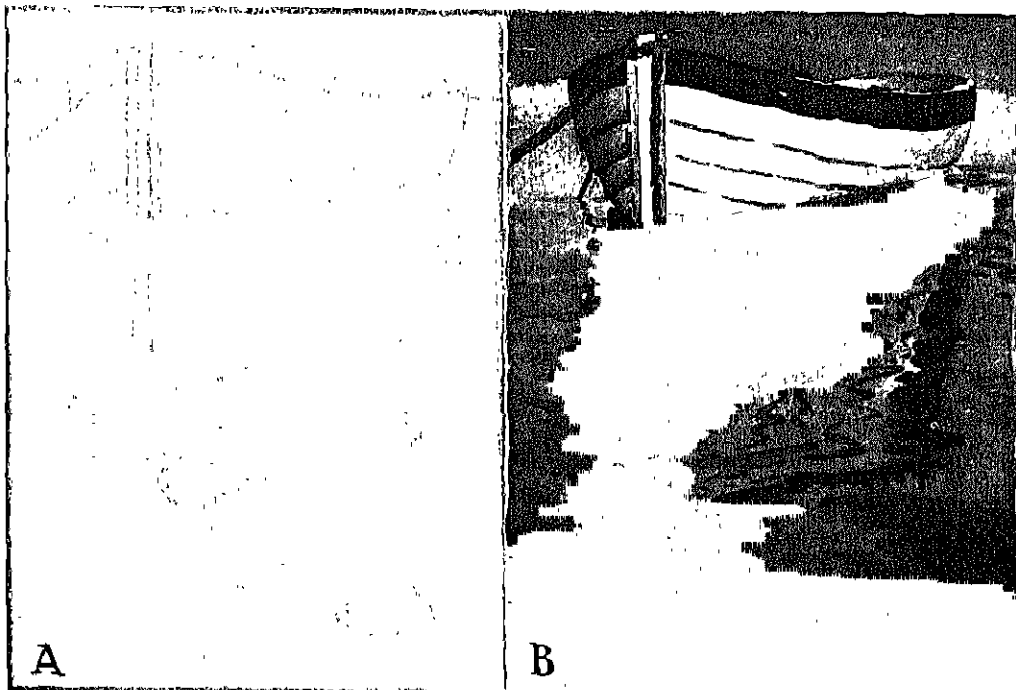


FIG. 46. BOAT WITH REFLECTION—WATER COLOUR SKETCH

A. Pencil rough-in.

B. Finished sketch.

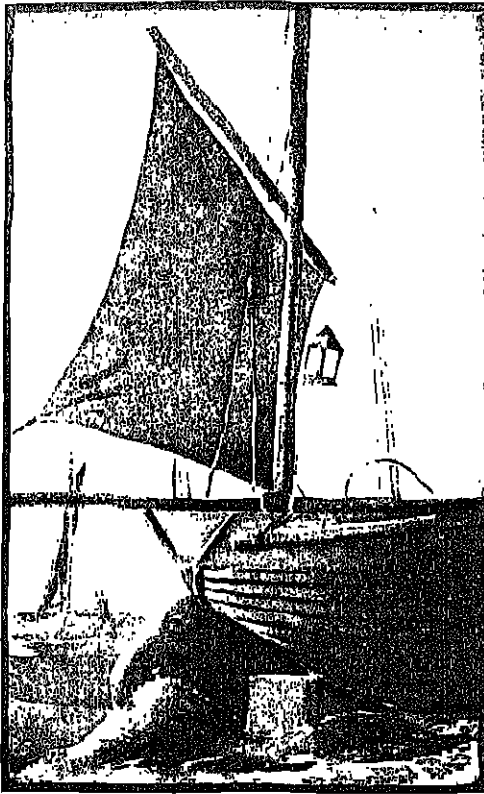


FIG. 47. SKETCH OF A MOORED BOAT

surface marks and so on that will help to show form, Pl. XVII B.

In pencil and pen sketches, keep to the expression of light and shade. Do not make the outlines black and ugly. In colour, keep to the general masses of colour, and, above all, try to express the beautiful swelling out of the hull, Fig. 46.

Strive to make your boat appear seaworthy; that is, not a sloppy, banana-skin affair, but a rigid, well-formed craft at which no sailor would turn up his nose and say, "Call that a boat! Well, I'd never trust myself in it!"

Sailing boats make charming sketches, but at first you must choose the simplest ones for your subjects. Do not at the beginning attempt those with very complicated systems of rigging. You must learn to sketch easy things well before you tackle the more difficult things.

Perhaps you will discover boats moored to a pier, or harbour, or drawn up on the shore (Fig. 47) but it is probable that the latter will not have their sails up. When you are sketching boats at anchor on the water, you must be prepared for their moving slightly with the tide. Do not sketch boats that are actually sailing along until you have had more practice in boat drawing, because each time you look at the subject, it will have changed slightly.

When you settle down to sketch, choose a safe, comfortable spot. If the sun is shining it may be possible to work in the shadow of a boat drawn up on shore. If you are thinking of working at the water's edge, do not forget that the tide may rise and cause you to beat a hasty retreat up the beach. Make sure that you are far enough up the beach to be safe from incoming tides. Do not go clambering about over rocks, settle down to work and then find that you are cut off by the tide. There are sure to be many excellent subjects to be seen from safe places.

If the boat is drawn up on the beach, you will find the hull fairly easy because you have had some practice sketching the hulls of rowing boats. Notice the form, feel its swell and observe its perspective.

Do not attempt to sketch floating boats that are on the move at their moorings.



FIG. 48. RAPID PEN AND INK SKETCH OF A SMALL BOAT

Choose a boat that is fairly easy to draw, with simple rigging. Notice its water line, taking on and showing up the shape of the hull as it rests on the water, Figs. 46 and 48.

When you sketch in pencil (Fig. 49) and pen, first of all build up the hull of the boat; mass in the general form of the hull, see that it is correct in proportion and perspective. Next, set up the masts. Notice the angle they make with the centre line of the boat, running from bow to the middle of the stern. Next, plan out the rigging, run up the ropes, notice all the details of the connections, how the stays supporting the masts are fastened to the hull, where the blocks are and how the rope runs through them and so on. Finally, run up the sails,

taking care to set them in the correct manner. You need to be careful about these details of construction, yet you must still try to keep your sketch broad and simple. You can do this by studying the subject beforehand and deciding in your mind what you shall leave out of your sketch. This is not easy to decide, it needs much practice, but you must try to use your imagination about it. Some of the great old masters spent years of their lives practising the "art of leaving out" as it is called.

When fishermen watch you sketching they will quickly point out any mistakes in the details of your sketch. Listen to what they have to say—it is always very helpful. Do not be shy, remember that they respect artists, think them very clever and consider

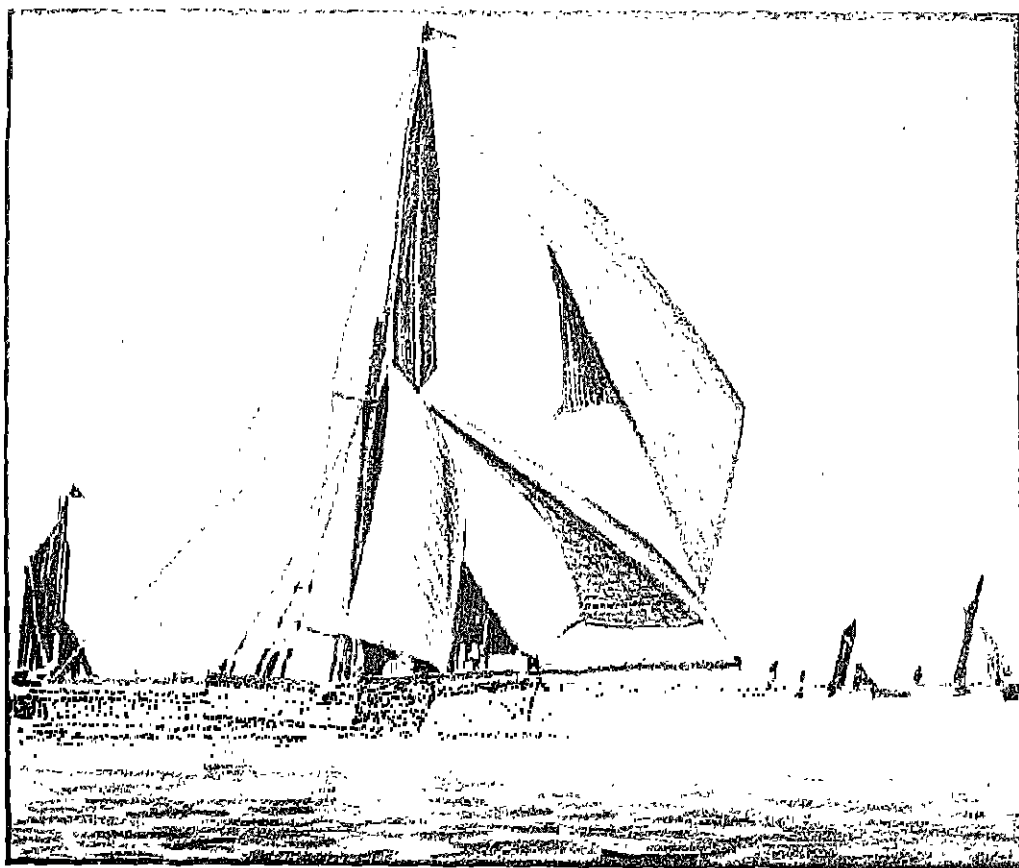


FIG. 49. RAPID PENCIL SKETCH OF SAILING BARGE

it an honour to be allowed to offer them an explanation of the rigging.

If you are sketching the boats in colour, faintly rough in the general masses first. Very carefully plan out the rigging. Next, wash on some pale sky, taking it right over the rigging unless the sails are lighter than the sky, and bringing it down to the horizon. Now flood on some simple, general colour for the sea, bringing it down slightly darker to the bottom of the picture. Leave some flicks of light here and there to give sparkle to the water.

Add any distance that shows, keeping it very simple and "in the background." Then lay on the general masses of colour for the hull of the boat, the sails and the reflection. Next, put in the masses of shade and the shadows. Add drier colour to wet colour. Try to feel the contrast between the form of the boat and the level surface of the sea with its movement of waves. Finally, put in the ropes with a fine pointed brush. Take care not to make these too heavy. Their visibility will depend on the way they are contrasted against the background. Notice the reflection, its tone and pattern. Put in any men to be seen on deck, they will give scale to the boat.

Aim at working through in one even operation—sky, sea, distance, boat, shadows and details—beginning very wet and adding drier colour where more definite edges are required. Never allow any part to dry into hard edges. Do not be afraid to wash out and make corrections, but rather than allow your work to become at all fussy, begin again. Frequently compare your work with the original.

Now, here is something important. Never be offended when people criticise your work. You can learn a lot from making mistakes and try not to make the same mistakes again. So, when teacher, or some stranger, criticises your sketches, do not get cross, or despair. Take notice of what they have to say. Often another person, looking at your work from another angle, sees something in it that has passed your notice.

Another thing is this: when you feel that your sketch is hopeless, put it away and forget it. Then when you look at it next time, with a fresh outlook, you may realise that it is much better than you thought at first. Self-criticism is very helpful. Another way to learn more about your own work is to invite criticism, but you must then be prepared for some disappointments as well as for a little satisfaction. Do not boast about your work, yet on the other hand, do not despair about it, but strive hard to reproduce something of the beauties of nature, even if it is only in a very humble way.

There are many objects such as capstans; coils of rope; piles of boxes, tubs, or nets; nets hanging up to dry and so on that are worth sketching if they appeal to your sense of interest, Pl. XVIII. These things usually make good shapes, roughly grouped as they probably are. You will find it more easy to make successful sketches of accidental arrangements and old, somewhat irregular objects than of new and neat objects with hard, clean lines and forms.

In sketching, notice the general masses and pattern of light and shade. With such a thing as a capstan, or a winch, take careful notice of its points of construction, perspective and proportion. Generally, it will consist of a vertical or horizontal drum, hand or machine turned, on which the rope or hawser is wound. Notice the way in which this drum is supported on the frame work of the capstan, or winch. In your sketch make it look as if it will work.

In sketching piles of things, such as ropes, nets, or rocks, acquaint yourself with the broad form and the general pattern of light and shade. Take particular notice of the ground line. This is an important line to sketch as it is the foundational line of the form and shows its perspective. Notice any directional lines of texture or shadow that will help to emphasise the form of the masses. Keep your treatments broad and simple, always aiming at the expression of form and trying to tell as much in as simple

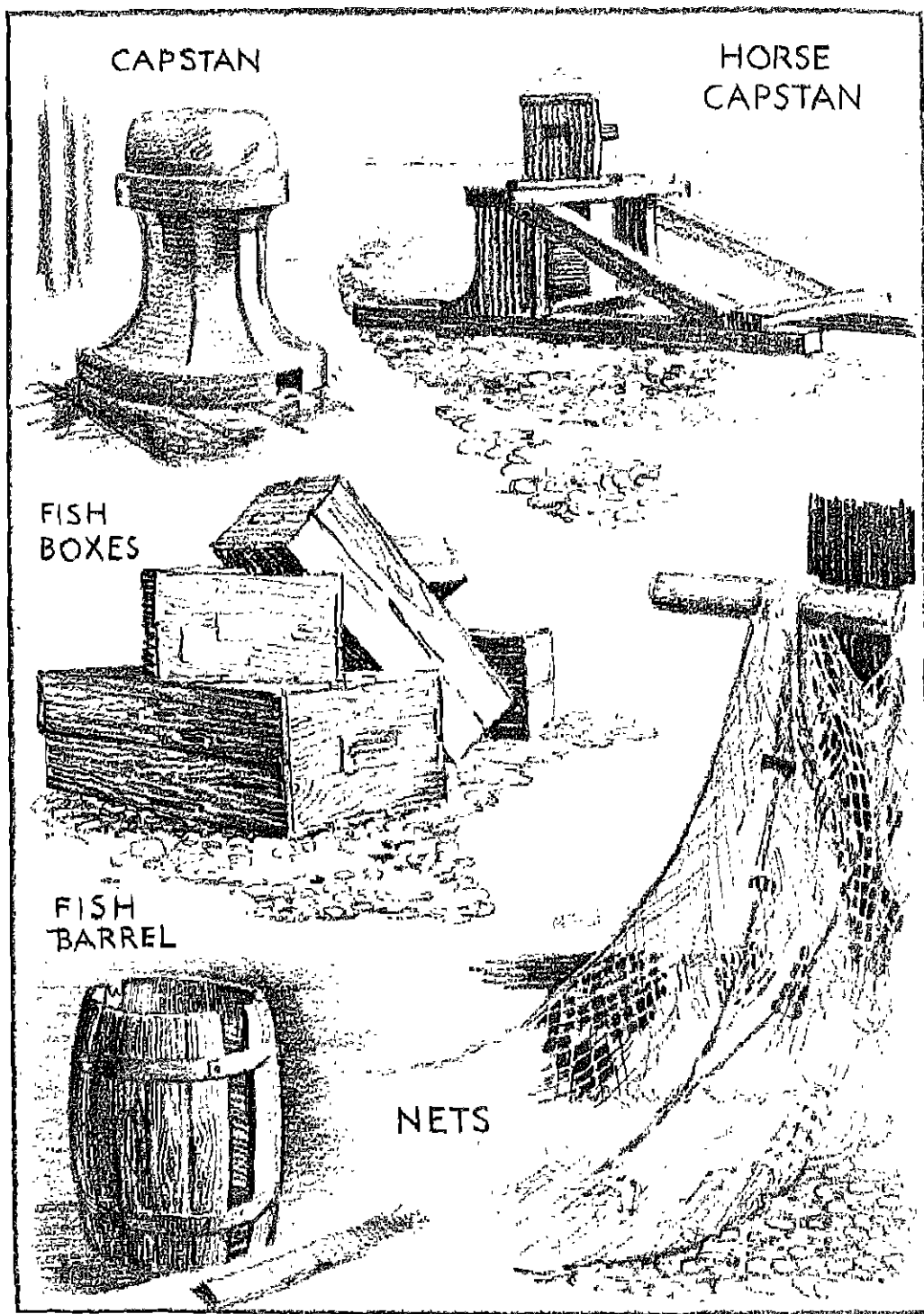


PLATE XVIII
PENCIL SKETCHES OF VARIOUS OBJECTS SEEN ON THE SEASHORE

way as you know how. Use your pencil strokes and pen lines to indicate direction and the nature of the surface.

Harbours and piers may appear rather difficult to sketch and they may be if attempted in their entirety. You can quite easily select part of a harbour or pier and make an interesting sketch of it. Perhaps some steps leading down to the sea, or perhaps old wooden piles sticking up out of the water with their reflections, or just the end of the harbour or pier with some distance. Parts of breakwaters also make good subjects for sketches.

You can use your view finder to help realise a pleasant picture. Select a pleasing arrangement of light and dark masses, have some foreground and see to it that the lines lead in to a suitable point of interest. Rough in the main masses. Then build up your sketch, making sure to draw the proportions and perspective correctly. Start ghostly pale and add darker and still darker tones of shade and shadow as you proceed.

There are beautiful colours to be seen along the seashore—blues, greens, purples and yellows. Such things as old wooden piles, jutting up out of the sea or forming parts of piers and breakwaters, are seen to be all manner of colours including purple, warm yellow-greys overhung with rich, dark greens. Try to capture the tone depth and purity of these colours. The sea itself is an ever changing rainbow of colours.

You will find many interesting types of people to sketch, such as fishermen (Fig. 50) boatmen and sailors, to say nothing of many other people and bathers. Figure drawing was more fully discussed in the previous chapter.

Notice the poses and costumes of the people, taking care with such things as caps, sleeves and trousers. Do not worry too much about small details of faces and hands. Try to get character into the sketches.

See the figure as a whole: not as parts, such as face, hands, body and so on. Rough in the pose and the main masses. Plan out



FIG. 50. FISHERMAN DRAWN WITH BRUSH

the trunk, head, arms and legs, giving them their correct proportions and balance. Your figure must not look as if it is falling over. Next show the shade giving roundness of form to the figure and clothes.

Try to feel round the figure as you work. Notice the nearest corner of the figure; there the colour and contrast of light and shade will be more full than in any other part. Try to imagine and work out the sections of the parts and the planes of the masses. Use your pencil strokes and pen lines to express the planes.

Animals, such as horses and donkeys on which to ride are to be seen at the sea-side. You can sketch these. How to sketch animals was dealt with in Chapter III.

As you look along the shore, you can see three parts in the one view (Fig. 51) land, sea and sky. Each of these three requires a careful study as a separate subject. Beginning with the land, we will deal with the

cliffs. Of course, there may be only houses seen along the shore, but if there are cliffs, they will make a grand subject for sketches.

Cliffs are so very proud, rearing up and saying to the water bathing their feet, "Now, Sea, you can come no farther inland." When you look at cliffs, try to feel the majesty of their towering heights. Notice the way in which they recede in bays into the distance, the sky line probably dropping slightly and the water line rising a little with each recession.

Your picture must have an interesting climax to which the lines and masses lead, either directly, or indirectly in such a way that the eye is kept within the frame. The masses of tone must be arranged so that the picture is not cut in halves.

Here is how a sketch of a simple pile of rocks was made. The scene was viewed through the view finder and a picture was selected in which the interest was well within the centre of the composition, a little to the left and above the exact middle;



FIG. 51. LOOKING ALONG THE SHORE—LAND, SEA AND SKY

At first you may be bewildered to know which part of the cliff to sketch, Pl. XIX A. Take your view finder and use it to select a picture. Do not attempt a wide expanse of cliff face—choose a simple view, one with an interesting pattern of light and shade and with definite masses. Perhaps an interesting pile of rocks at the foot of the cliff (Pl. XIX B) or a part of the cliff jutting out into the sea, Pl. XIX C. Notice the attractive recessive character of the rock forms, set one behind the other, each with a distinct silhouette.

the masses of light and shade were well balanced.

The scene was looked at carefully for several minutes so as to impress it on the mind. It was considered as a pattern of definite broad masses, the details being ignored. It was viewed through half-closed eyes.

The masses were then faintly drawn in pencil on paper; care was taken to give them their correct proportion and perspective. Each form was considered in relation to the others. The broad masses of shade

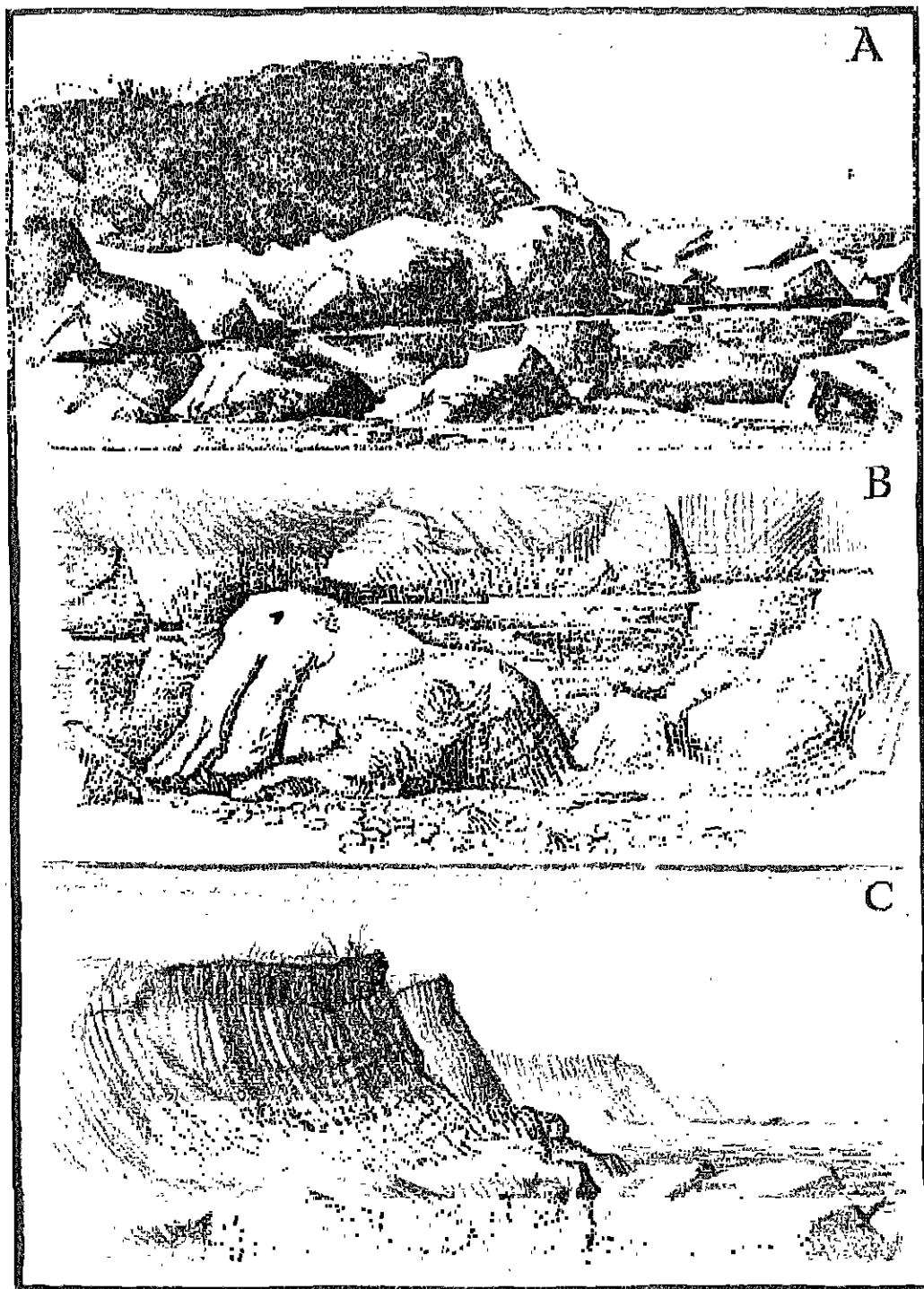


PLATE XIX
TWO PENCIL SKETCHES, B, C, OF ROCKS DRAWN FROM THE SAME POSITION, A

and shadow were next suggested, these gave form to the rocks. Due respect was paid to such things as lines round the bases of rocks, nearest corners and planes.

The sketch was held at arm's length and compared with the original. Mistakes were corrected before the heavy work was put on.

The different planes of the rocks were indicated by the direction of the pencil strokes. In working, with continued reference to the model, the form of the rocks was felt, the pencil following the feelings and expressing them on paper. Flat planes on the top of the rocks, with very little work on them, just a few touches to show their horizontal nature; side planes, differing in tone according to position and lighting, the pencil expressing their direction; under planes, deep in tone.

The distant parts of the sketch were kept simple to give an impression of distance, the amount of detail being increased as the parts came nearer in the foreground.

The sketch was once more compared with the model. By this time parts of the drawing needed darkening. A few touches were added to the nearest rock—crevices and extra texture to improve the suggestions of form. The foreground was pulled together in one broad shadow that had crept across from the left. And there on paper, after twenty minutes' work was an impression of that pile of rocks. It was held out at arm's length for one more criticism. These questions were asked:—

Were the forms well drawn?

Could it have been more broadly treated?

Was the centre of interest a good enough climax to the picture?

Was there too much dark on the light parts?

Was the picture well balanced?

The sea is the next to be considered. The sketching of water in lakes and rivers with reflections was discussed in the previous chapter. The sea is more difficult. It is more impressive, more powerful. It is also moody, one day calm and gentle, the next day rough and unruly. It is never still, always

on the move, surging in and out. Its colour is a revelation; even on a dull day the waves are beautiful with blues, greens, purples and greys with white foam crests.

When you are sketching the sea—in pencil, in pen or in colour—try to convey the impression of its level surface in ceaseless, rhythmic movement. There was once an artist who painted a picture of the sea. This he gave as a present to a dear friend. When the artist visited his friend, he was disappointed to notice that his picture was nowhere to be seen. On being asked for an explanation, his friend, somewhat embarrassed, admitted that he could not bear to look at it, because when he did so he became violently seasick.

Well, there is no need to make your sketches as unpleasantly real as that, but do try to express the weight and the power of the sea as a mass of water. Notice its surface running in perspective right away into the distance. If you are showing a large expanse of sea, keep the far distance plain, the middle distance with very few touches and coming into the foreground with more and more details, noticing the perspective of the waves.

Notice the direction of the wind and its effect on the waves. Observe the differing patches of surface colour. Note the forms and pattern of the waves and the crests of foam. Take notice of the way the waves break on the beach. The waves have beautiful forms with curved lines expressive of life and movement.

A boat's sail will form a good centre of interest in a sea sketch (Fig. 52) but it must be carefully placed in just the right climactic position: a rising blue-green sea with a pattern of white foam and far out the lonely, red sail of a fishing vessel.

You must keep your sea sketch broad in treatment and have in mind the idea of the boundless ocean, reaching, reaching far away over the horizon and out of sight: the waves growing smaller and vanishing totally near the sky line, Fig. 53.

The sky is the next and last thing to be

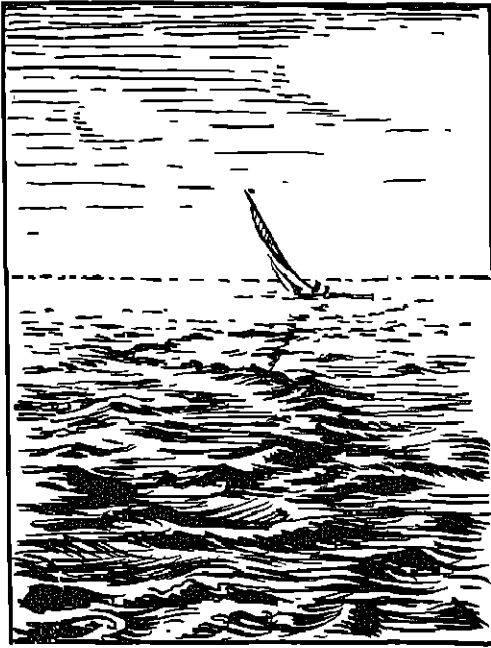


FIG. 52. BOAT AS CENTRE OF INTEREST
IN A SEA SKETCH

considered. Sketching skies necessitates a study of clouds. Do not attempt whole skies at first, but take simple clouds noticing their forms and characteristics, Pl. XX. Clouds have form—Ruskin described them as being “sculptured mist.” The laws of perspective apply to them—notice the way clouds are piled up one behind the other, or the way in which their under parts are seen in perspective, similar in outline, spreading away down the sky.

Wind affects their shapes and because of this, one way of showing wind in a sketch is to express it in the cloud shapes of the sky. Another, more subtle, way of expressing wind, is in the direction of such things as bending trees and grass, flags and smoke.

Clouds frequently change their shapes as they race across the sky and this calls for rapid work and careful observation. There are four main types of cloud, Pl. XX. The first, cirrus, or thread clouds, known as mares’ tails, are detached wisps of cloud very high up in the sky. The second,

cumulus, or heap clouds, known as wool-pack, or cauliflower clouds, are lumpy masses of fairly low cloud. The third, stratus, or flat clouds, are even layers, of low, cloudy fog. The fourth, nimbus, or rain clouds, are dense layers of dark shapeless clouds with ragged edges. There are various combinations of these four main types, such as cumulo-nimbus, or thunder clouds, and cirro-cumulus clouds, known as a mackerel sky.

When you make sketches of sky, see them as more or less transparent patches of tone, or colour, having very delicate light and shade. In pencil, or pen sketches, keep the edges tentative and soft, bearing in mind the edges of cotton wool. Do not make them look solid, yet indicate, perhaps by the merest touches, the division between light and shade. Look at your models much more than at your paper; try to memorise as well as sketch the forms at which you are looking. In water colours, rapidly wash in the pale



FIG. 53. A SEA SKETCH

masses, then add the darker pattern of masses to the still wet colour. Keep the edges soft, never allow any to dry hard. Look at the sky and you will find that although there may be strong contrast of tones, none of the clouds will have harsh edges. Try to "feel" them in your mind as you work—have you ever run your hand through and felt how soft is the steam coming from the spout of a kettle?—and portray them for what they are, "sculptured mist."

Keep your eyes open for any objects that have beauty of form, line and colour (and tone). Use your own imagination and originality in the choice of subjects. Sketch anything that has pictorial interest with well-defined masses. Avoid those things that appeal to you only on the strength of their associations, or which have complicated details. Be original. Simple, interesting subjects, broadly treated, with a good climax—centre of interest—make the most successful sketches.

Teaching hints.—The seashore offers many good subjects for sketching. Simple objects should be chosen at the start. A fair amount of technical knowledge is required in the drawing of such things as sailing boats with complicated systems of rigging, so that they are not suitable for beginners. Care should be taken to guide the pupils in the choice of reasonable subjects.

The ideal subject for a beginner to sketch would appear to be one that has both interest and beauty, while it is of such a nature that it will not overtax the sketcher's powers as a draughtsman. As it is, the tyro is usually so occupied with the execution of his sketch, that any unnecessary complication of subject is bewildering and invites incompetence.

The beginner invariably begins by sketching a subject such as the latter—a wide expanse of landscape with mountains, intricate groupings of ships, houses, or trees, in each of which only the most experienced artist would be able to see and reproduce any clearly defined masses or breadth of

form. Simple, easy to draw subjects that possess pictorial interest make the most successful sketches.

The teacher must dissuade any attempts made to sketch subjects that are too intricate, or expansive, not by explaining that it is wrong to do so, but by proving that it is unnecessary.

Sketches should be spontaneous and should not take too long in doing, say, not longer than half an hour, although in actual practice it is best not to enforce any time limit. Sketches are best left unfinished as mere impressions rather than rushed to a forced ending.

The good sketch will be one that shows the most truthful and explicit representation in the most simple way, with feeling. When the question arises of what to include and what not to include in a sketch, the teacher should bear in mind that the essential parts of a sketch are those which show form. Therefore, tones and textures expressing planes are more to be desired than outlines that show only the limits of form.

Actually, there is no such thing as outline in nature; edges are the result of two contrasted tones. The use of heavy lines tends to distract from the expression of form.

Details of surface are secondary in importance to the indication of form—tiles on a roof, bricks of a wall, leaves of a tree—and must be used to aid and not to hinder the expression of planes.

The amount of detail to be included in a sketch may be reasoned as follows:—

1. Far distance—minimum amount of detail.
2. Middle distance—medium amount of detail.
3. Foreground—maximum amount of detail.
4. Planes receiving most light, minimum amount of detail and maximum of tone contrast.
5. Planes receiving least light, maximum amount of detail and minimum amount of tone contrast.

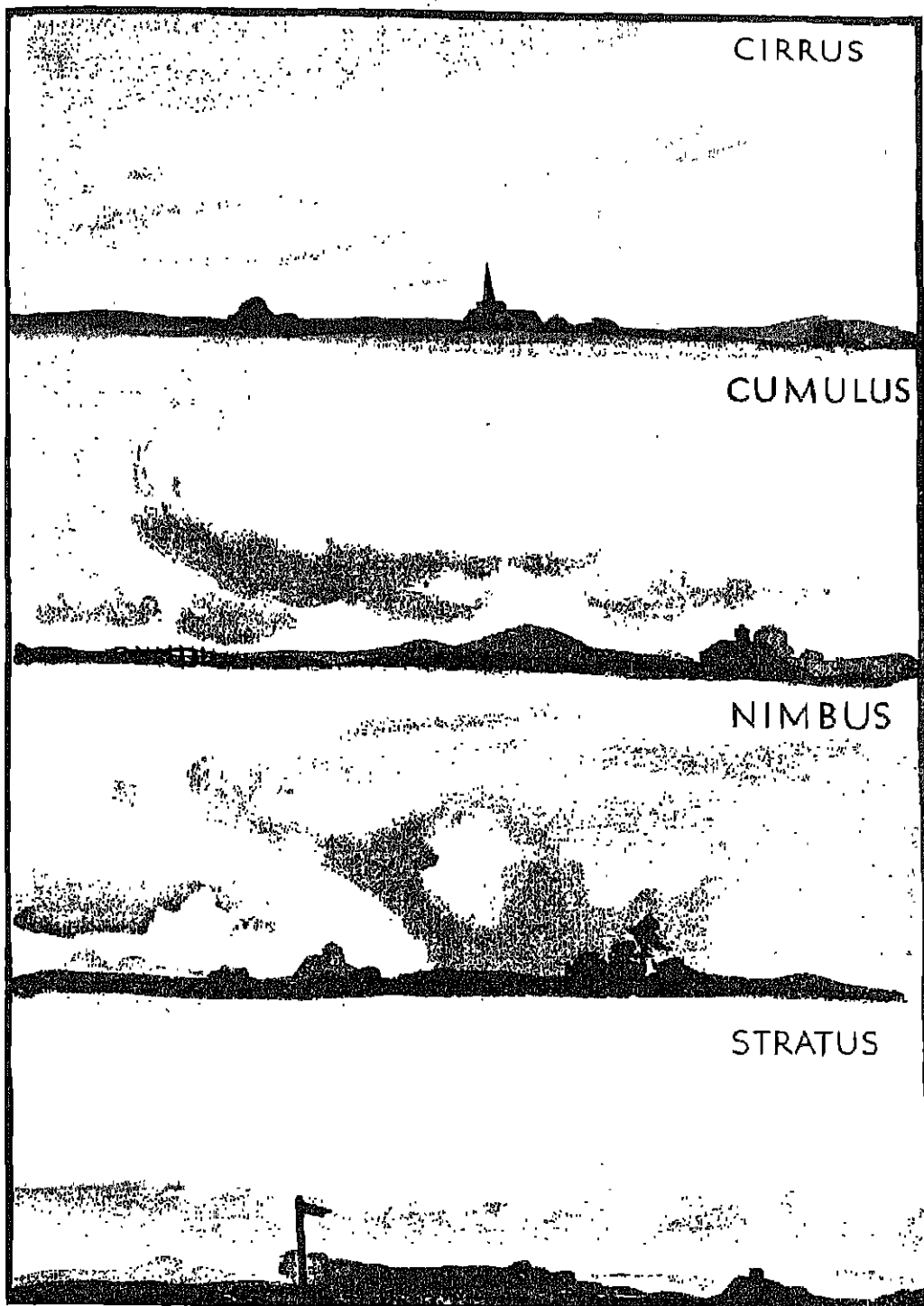


PLATE XX
TYPES OF CLOUD FORMS SHOWN AS WATER COLOUR SKETCHES

6. Nearest corners—maximum amount of detail and contrast.

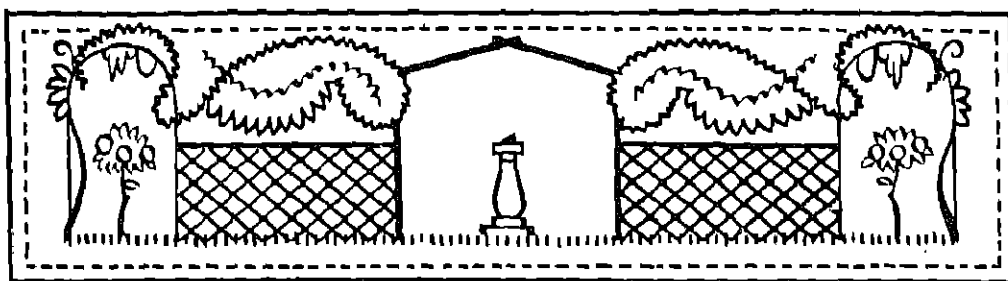
7. Picture's edge—least amount of accentuation.

8. Centre of interest—maximum amount of contrast in the whole picture.

These foregoing rules are general, and they

cannot be applied with such precision to colour as to drawing. Distant colour can actually be stronger in value and contrast than near colour, but in the sketch it is best to reserve this paradox for the centre of interest or climax of the picture.

VI. SKETCHES IN THE GARDEN



Many people wander far afield in the search for subjects to sketch, when right under their noses, in their own back gardens, there are enough subjects to provide a whole month's sketching—and it does not matter how small the garden is.

Of course your adventurous spirit may argue that it is better to wander far from humanity, down country lanes, prepared to meet unexpected beauty round the next bend. To these we answer, "Make the most of everyday things." Because these are so familiar, they are usually least observed.

There was once a man living in London who passed the Houses of Parliament on his way to and from work every day. On being asked the name of the square adjoining the Houses of Parliament he replied, "I do not know." An American visitor overhearing the question was able to supply the correct answer. Yet, for the past thirty years the Londoner had always been in such a hurry passing the place that he had never had time to discover the name of the square.

Well, do not be like that man, but pack up your sketching outfit and make an

expedition into your own garden to find the beauties hidden there.

Gardens will bring to your minds visions of flowers and roses. Standard rose trees are lovely, graceful things, Fig. 54. Before you begin to sketch, make sure that you are sufficiently far away from the model to take in at one glance the whole of what you wish to sketch. When it is necessary to look up and then look down in order to see the top and bottom of your model, it proves that you are too close. Experience will teach you to know the best distance at which to view subjects for sketching.

When you sketch rose trees, forget the separate leaves and flowers for the time being. See them as a whole, graceful in proportion and glorious in colour. As a foundation on which to base the drawing, rough in the general masses of the tree, head, trunk and base. Notice the form of the head and its proportion to the trunk. Observe the pattern of the light and shade and the amount of contrast between tones. Do not worry too much about light showing through the head, but do notice the smaller

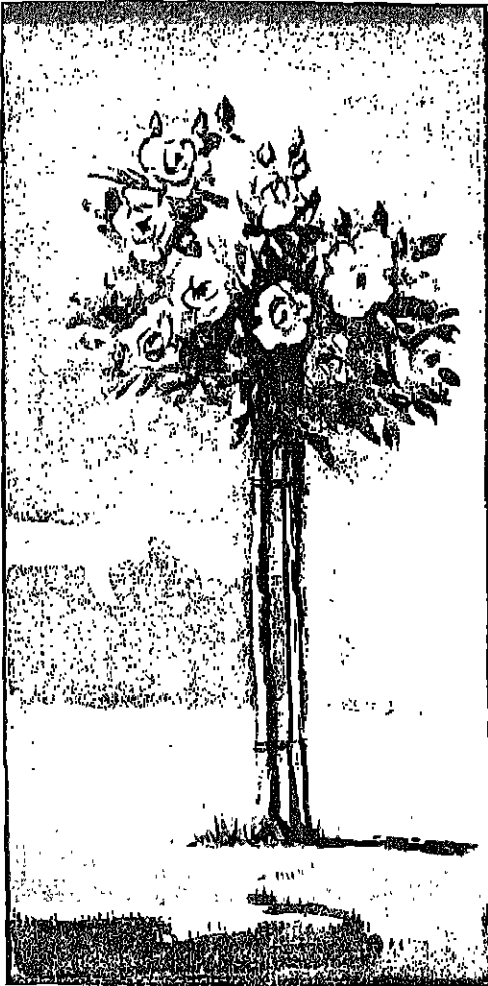


FIG. 54. A STANDARD ROSE TREE

masses and the rhythm that connects them, bringing them in harmony with the general form.

In pencil or pen sketches, make use of direction of line to indicate growth and form. Keep the treatment unfussed. Work boldly, even daringly. Do not let your pencil, or pen, think you are afraid of it, or it will not work properly for you. Notice the wonderful edge patterns of the masses, but do not allow the edges to become more prominent than the expression of form—keep them quiet in treatment.

In colour, wash some pale background

tone on first. Next, put in the pale tones of the tree, then the deeper ones and finally the deepest tones of all. Use your colours daringly, if you like, but not glaringly. Pure, bright colour need not, must not, be harsh, or discordant.

As you work, think of each part in relation to the rest of the sketch, tone to tone, shape to shape, line to line and colour to colour so that the whole composition is harmonious. The eye must not be attracted to the wrong places, that is, emphasis must be placed only on those things which are essential to the expression in the sketch, such as the roundness of form and the drawing of perspective.

From rose trees we move on to fruit trees—apples, pears, plums and cherries. Fruit trees in blossom are sheer loveliness. Who would not want to make a picture of a fairy landscape cherry tree in bloom? Trees as sketches were discussed in Chapters III and IV.

Of course, in a small garden it may be difficult to get far enough back from objects to see them in comfort. But there is no need to include the whole of the objects in a sketch; they may be cut into by the edge of the picture. Use your view finder to help realise your pictures. Pleasant little pictures can be made of parts of hedges seen in perspective and pathways leading up to some object, such as a sundial.

Sundials, bird baths, statues, and other garden ornaments can be used as models for sketches. Here a knowledge of cylinders and cubes in perspective comes in useful. You may think that there is little or no colour in such objects, made of stone, or cast in cement. But look again and you will discover that there is wonderful colour in them—delicate tints of golden yellow, pinks, blues, purple and green. Imagine a sundial in a sunny garden, Fig. 55. It is of marble, white as snow. The sun shining on it gives it a pale golden glow. There is purple in the shadow. The grass reflects a green hue on to the shaded sides and some green stain has trickled down one side from the copper plate on the top. The background is rich

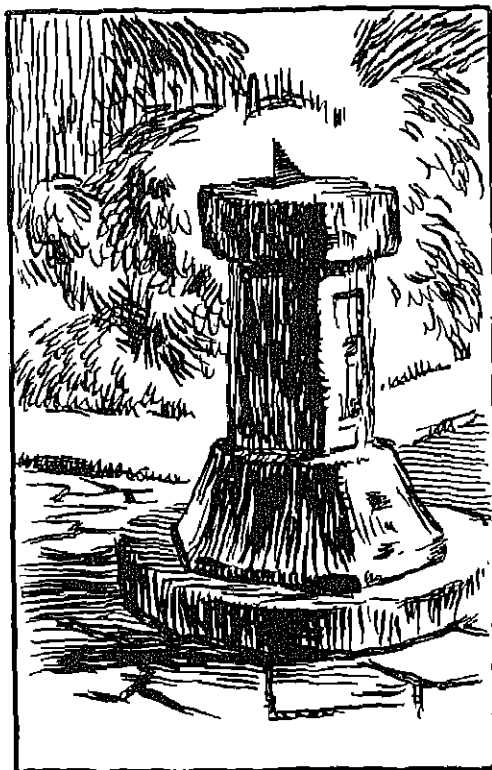


FIG. 55. A SUNDIAL

with the colour of flowers and the foreground is warm, golden gravel. There is a riot of colour for you, yet before it was pointed out to you, your sundial would have been white with grey shadows.

Here is how a sketch was made in pen and ink of a garden statue, a girl pouring water out of a pot. It was a very simple statue. First of all the whole mass was sketched in faintly with pencil. The proportions of the sub-masses of the figure—head, body, and so on—and the pot and base were next made correct. The base line of the statue was carefully observed and shown in the drawing. Always see to it that your model stands firmly in your sketch.

Next, the shades and shadows were indicated. The edge of the shade was then carefully shown. It is this line, where the light side meets the shadow side of the model, carefully drawn, that will help to

give form and solidity to your drawing. This line is known as the third dimensional line, because it shows thickness through, the third dimension of a solid after its length and breadth.

The background tones were next drawn in with the pen, bringing them carefully up to the outline of the statue which was left soft. The statue was now given form, the pen lines being used to indicate the different planes. The lines were drawn round the forms, tone being changed by strength of line and not so much by cross-hatching. The foreground was put in, the direction of the pen lines was used to show the flatness of the ground, then the ground shadow was shown. When the ink work was dry, the

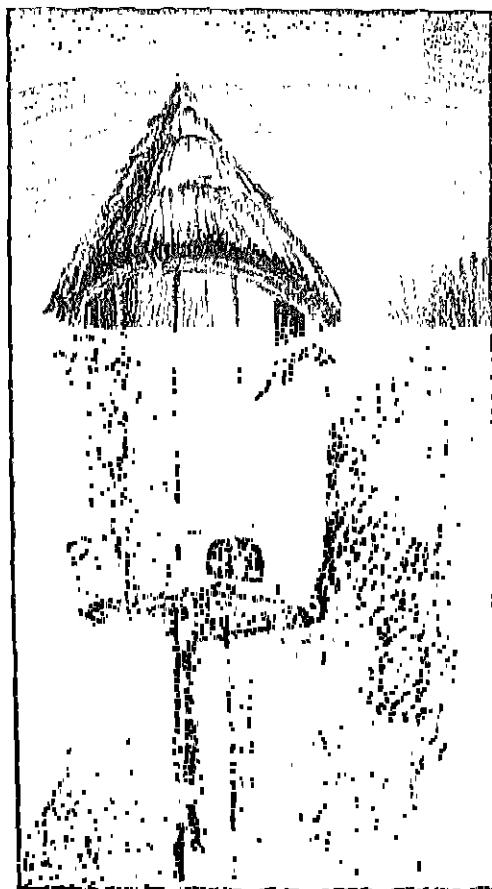


FIG. 56. A DOVECOTE

pencil lines were erased. The sketch was frequently compared with the model at arm's length and these questions were asked by way of criticism:

Is any of the work in the sketch unnecessary?

Could the drawing have been more simple and still tell the same story?

Dovecotes make interesting sketches. Try a sketch of a dovecote, looking up at it from below, say, two or three yards away from the base. Notice its general mass and shape, its proportion and points of construction. Note the way the lines run down in perspective. The result of such a sketch will be a sort of worm's eye view, Fig. 56.

There are other interesting objects to be seen in the garden that you can sketch, such as dustbins, lawn mowers, rollers and water butts. But generally it is best to leave alone those things having mechanical detail and regular form. Much more successful sketches can be made of objects that have irregularities of form and colour. A grimy old dustbin with its sides battered (Fig. 57) will make an interesting picture, while a brand-new perfectly shaped "oh-so-shiny" dustbin will not possess sufficient pictorial interest, or charm to warrant trying to make a successful sketch.

Look for beauty of form, line and colour. Do not judge subjects for sketching on their merits of quaintness, or prettiness. These merits are shallow and often silly. Beauty



FIG. 57. A BATTERED DUSTBIN

is deep, reasonable and simple. There is something else, very attractive that is to be seen in gardens, homely gardens, on washing days. That is, washing hanging on the line to dry. The shapes and forms of clothes hanging on a line, possibly being billowed out by the wind, are full of interest, Fig. 58.

First, in your sketch put up your clothes posts, measure their heights and distance

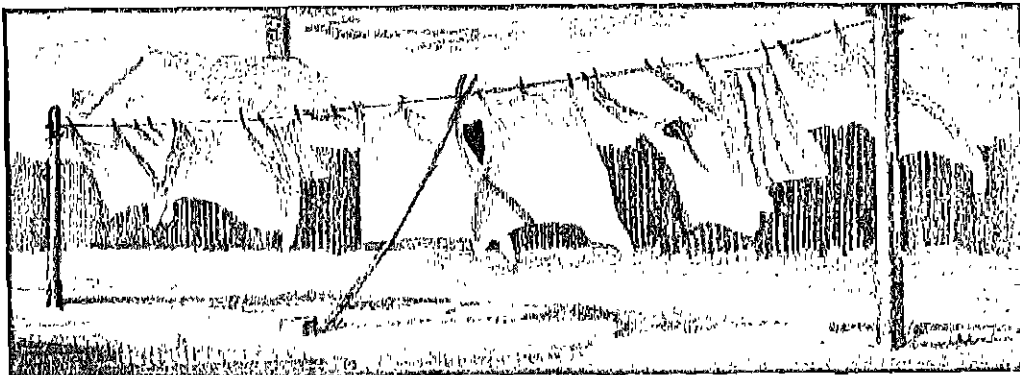


FIG. 58. CLOTHES HANGING ON A LINE—A PENCIL SKETCH

apart. Then, stretch the line from post to post, putting the props up if they are there. Then peg the clothes out to dry. Notice their shapes and shadows. Observe the life-giving curves of their shapes where the wind blows them. Sheets fill out and look like the sails of a windjammer; shirts execute very agile dances waving their arms above them; and socks hang heavy and rather aloof from the frivolous shirts. Notice the pattern of the clothes against the background.

Summer houses, sheds and greenhouses may be seen and sketched. Sheds make lovely sketches. If you have archways in your garden, make pictures of them showing some distance through the arch.

Perhaps pussy, or Fido the dog will pose for you. Catch them asleep and sketch them as they snore, but do not let them know that you are sketching them, or they will be sure to want to see what you are doing and will never keep the same pose for two minutes running. Cats are lovely, sleek, graceful animals to sketch. Watch the curves of their backs and the rounded perfect proportions of their bodies. It is fun to make a series of rapid studies of moving animals, showing the curve, or movement of the back, position and balance of the head, line of tail and the legs, showing angles and direction of movement. These rapid studies will teach you a lot about the forms and poses of animals. Do not attempt to make carefully finished sketches of them, but do what you can to indicate mass form, direction of line, proportion and pose. Pencil, or chalk will be the best medium with which to make the sketches, Pl. XXI.

Why not make sketches of such subjects as the corner of a shed with some distance and sky, a broom, or spade leaning against the wall of the shed and some simple foreground? Use your view finder to assist in selecting the picture which must have well-balanced masses and a suitable climax, or centre of interest.

If you try to sketch the subject straight away on paper without any previous thought,

the grouping of objects may not work out as well as might be. Several objects in one picture need to be harmoniously grouped with regard to shape, line and tone. As you have already learnt, it is not wise to place masses so that they cut the picture in half and remember that lines and direction of masses should lead the eye to the centre of interest.

This quality of arrangement and balance of the parts of a picture is known as Composition. When you are choosing a picture through your view finder, be thinking of this pleasant pattern of lines and shapes. This choice of picture pattern, or composition, is somewhat a matter of personal taste and there are no definite rules set down about it. However, there are certain points of composition universally respected by artists and these will be discussed in the next chapter.

Teaching hints.—This chapter has offered a few suggestions for subjects suitable for sketching to be found in most gardens. The size of the garden need not be a bar. In a small garden the drawback of sketching in a confined space, that is, the difficulty of getting far enough back from the model, need not prevent good work being done there. Parts of large objects may be used as subjects, the edge of the picture cutting into, or through, the objects, such as the following: a door of a shed partly opened to show the interior; a corner of the garden where two stretches of fence, or hedge meet at an angle; a gateway, slightly opened to show distance beyond; a view from beneath a tree—a small tree, such as an apple tree—using the side of the trunk, lower boughs as well as roots, as part frame of the sketch.

There is one point to bear in mind with regard to the choice of subject. New objects that are very regular, or perfect in shape, or which have very new clean colour, are not so suitable for beginners' sketches, as are objects that are mellowed by age. These latter objects have more charm in the form of irregular colour occasioned by such things



PLATE XXI
PENCIL SKETCHES OF CATS AND DOGS

as weathering, or the presence of moss, or lichen, or in the form of interesting shapes coming as the result of ill-use, or collapse.

Dirt and decay are not beautiful and are not to be admired, or desired, but maturity does lend ripper charm to an object; harsh colour is made mellow and hard edges and

sharp corners are rounded and softened. There is not the same beautiful feeling in a newly-built wood fence as can be seen in an old tumble-down fence round a field in the country. Neat, elegant objects are not easy to render in sketches. Shininess and hard edges have little charm of character when reproduced as sketches.

VII. COMPOSITION



Fitness to purpose is the prime basis of judgment in all art and in sketching; the picture must be fitted to its purpose, that of telling a story.

You have learnt that the story of a picture is best told in a simple way. Well, besides telling the story, the parts of the picture must be placed in a fashion that is both pleasant and helpful to the beholder. This is known as *Composition*.

Composition consists in placing, or arranging, the different component parts of the sketch together so as to create a harmonious whole out of them. Pictorially, every mass, line, tone, or colour must be arranged in such a way that the rest are benefited. In that way, no part is independent no matter how forcible, and no part is unessential no matter how small or insignificant.

Rhythm of line; balance of masses; proportion of masses; contrast of line, shape and tone or colour; all bound together into one harmonious whole go to make good composition. These qualities must be present, but must not be forcibly shown. Thus, the

rhythm of line must be felt rather than seen as hard definite lines. There is a rhythm in trees that is to be felt along the edges of shadows, through leaf masses and branches, rather than to be *seen* as clearly defined lines. Again, with contrast, this must be vigorous if you like, but not harsh—a short cross line, or a mere touch of contrasting colour adding life to another.

It will be a good idea to try out some variations of composition on a scrap of paper, first of all in pencil or pen and then in colour. Make these trials about 5 in. by 6 in. Think of the composition as an unsymmetrically balanced pattern. Think of it as a pair of scales with its fulcrum at the centre of the picture. Thus, dark will need to be balanced by light, large masses will need to be balanced by small masses, mere touches placed here or there being capable of restoring perfect balance. Use contrast, not only vigorous contrast of strong colours, but delicate contrast of light and dark, or colour. You will find that it is possible for the unity of the whole to depend on the slightest touch,

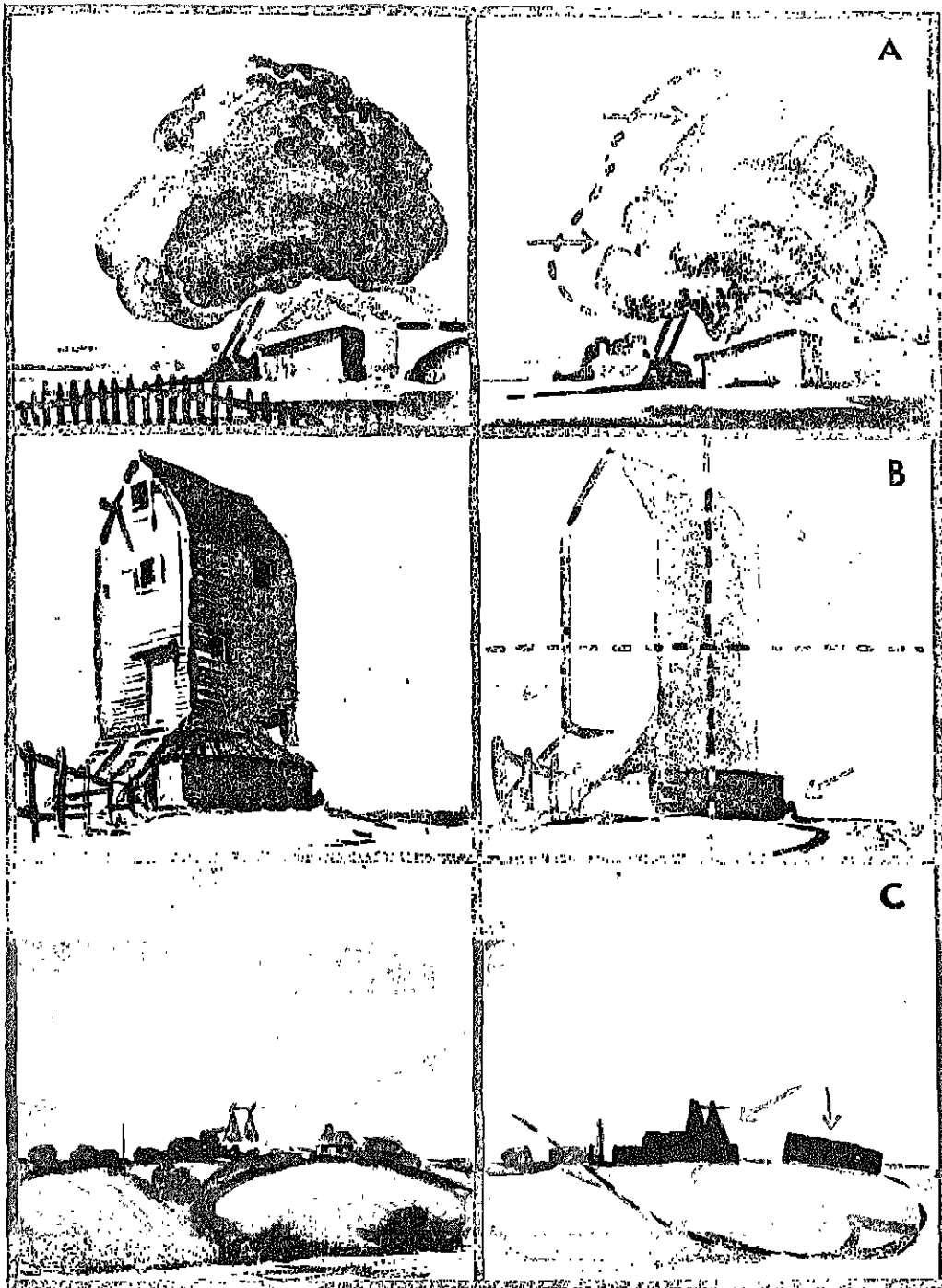


PLATE XXII
COMPOSITIONS AND PLANS—PART I

- A. Objects may be shifted slightly to improve composition.
- B. The central object of interest (indicated by arrow) should not be placed on a central line.
- C. There should not be two main objects of interest equal in size (indicated by arrows).

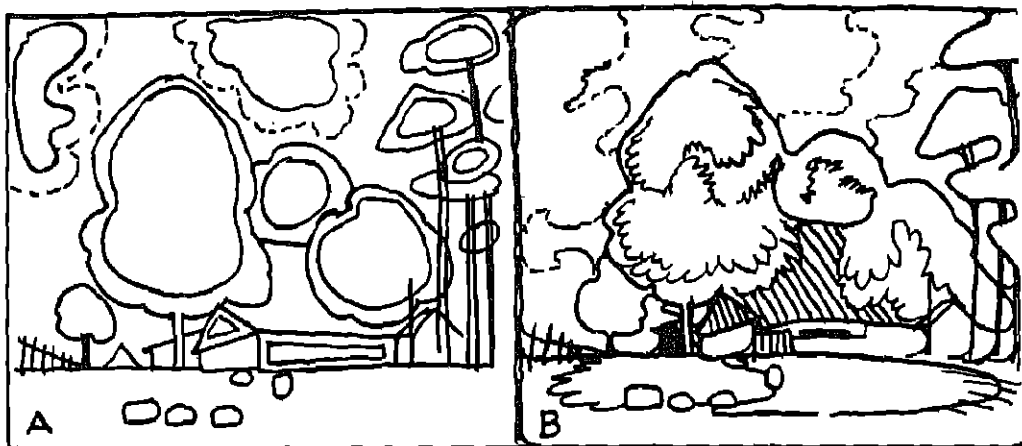


FIG. 59. EDGES OF MASSES

A. Isolated shapes, emphasised to show the break in harmony of the composition.
 B. Masses linked together with flowing lines to make a harmonious composition.

or line, so delicate may be the balance of the composition.

The following hints will help you to obtain good compositions:

1. Objects may be shifted a little to the left, or right so as to improve the grouping, but this is liberty that should not be abused, Pl. XXII A.

2. Never place the central object of interest on a central line of the picture, Pl. XXII B.

3. Never have two main objects of interest of equal size or importance in the picture, Pl. XXII C.

4. Never place an object in the centre of

a space, or midway between two other objects, Pl. XXIII A.

5. Never place a line, or mass, so that it cuts the picture into halves, either vertically, horizontally, or diagonally, Pl. XXIII B.

6. Never allow the eye of the beholder to wander out of the picture. The lines and directions of the objects must lead the eye to the central object of interest in the picture, Pl. XXIII C.

The edges of dark and light masses will result in lines and these must be pleasing. They must be continuous in effect and carry the eye easily from shape to shape, Fig. 59B. Isolated masses having independent

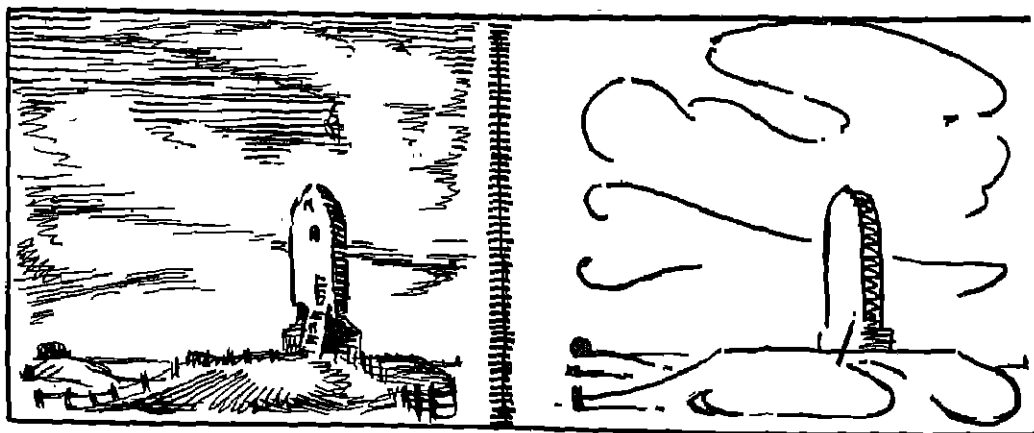


FIG. 60. STOPPING LINES FROM LEADING THE EYE OUT OF THE PICTURE

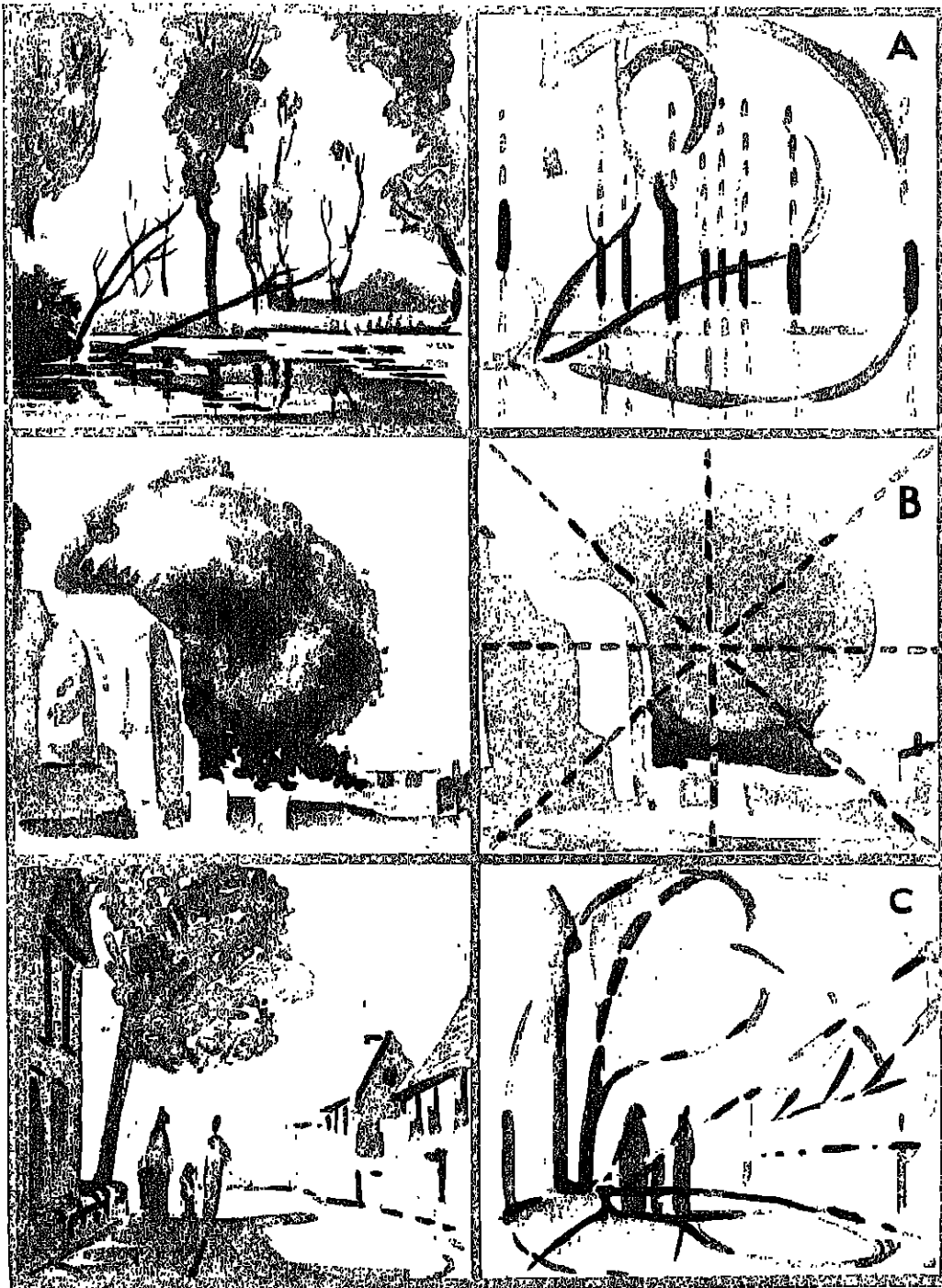


PLATE XXIII

COMPOSITIONS AND PLANS—PART 2

- A. Never place objects in the centre of a space, or midway between two other objects.
 B. Masses must not be placed so as to cut the picture into halves, either vertically, horizontally, or diagonally (indicated by dotted lines).
 C. Lines and directions of objects must lead the eye to the centre of interest (the base of the tree).



After the painting by Rembrandt

[Photo: Braun]

PLATE XXIV A
THE MILL

outline shapes arrest the eye and break the unity of the picture, Fig. 59A. All lines and masses must be interdependent.

Lines leading the eye to a point should start in a subdued fashion and gain emphasis as they proceed to their goal. Lines can be stopped—especially to prevent them from leading the eye out of the picture—by the merest touch, Fig. 60. Where lines suddenly meet or cross, it is better for them to do so boldly, almost at right angles, rather than weakly, at acute angles.

. Look for life-giving curves; these can be steadied by straight lines. In landscapes with curves in the shapes of trees and fields

and clouds, also in seascapes with curves in the shapes of waves and clouds, straight lines are valuable to steady them. Conversely, curves may be employed to add life to such sketches as those of buildings where there are many straight lines.

To the ordinary person, beauty of colour in a picture means almost everything, but more important and more subtle are beauty of line, shape and proportion. Look for these beauties; learn to discern them. Try to combine dignity and simplicity in your compositions.

Examine the pictures painted by old masters and try to understand their beauty



PLATE XXIV B
COMPOSITION DIAGRAM OF "THE MILL" BY REMBRANDT

of design, composition and colour. Look at those reproduced on Pls. XXIV to XXIX and also at the analyses of their compositions.

There is a marvellous simplicity of mass and sky line in *The Mill* by Rembrandt (1607-1669). Do you notice how the lines tie up at the edge of the cliff where the river runs round the corner out of sight? It makes one curious to know what is just round the corner.

In each picture the eye is carefully prevented from leaving the picture. In the next picture to be examined, *The Avenue*, by Meindert Hobbema (1638-1709), the eye

is led, almost forcibly into the centre of interest. Observe the sense of perspective in the drawing of the road and the trees.

Kirkstall Abbey, a water colour by Thomas Girtin (1773-1803), may at first sight appear more complicated in detail, but actually it resolves itself into a very simple composition plan. The lines are simple and fluid and add calm and dignity to the landscape as well as balancing the intricate central group.

The picture by John Sell Cotman (1782-1842), entitled *Wherries on the Yare*, is an example of simplicity of mass shape and beautiful proportion. The masses are well placed. The lines are very interesting. For



After the painting by Hobbema in the National Gallery]

[Photo: W. F. Mansell

PLATE XXV A
THE AVENUE

example, notice how the eye is allowed to follow the line running from the tip of the nearest sail, back down to the group of figures. Here it is stopped and sent back to the centre of interest.

Next look at the seascape by the Dutch painter, H. W. Mesdag (1831-1915). Notice how the whole composition forms a triangle, —a simple plan. Note the repetition of the boat shape, from the nearest boat out to that furthest away on the horizon, and observe the sense of perspective and distance this gives to the sea. Also, notice the movement expressed in the waves.

Lastly, look at the picture of the bridge across the Thames, as seen at evening, *Old Battersea Bridge*, by the American artist, James McNeill Whistler (1834-1903). Notice

and appreciate the simple majesty of the composition. The quality of light and dark even without colour is very beautiful and the proportion is particularly grand. Do you notice how the straight lines enhance the sense of evening calm and how the solid upright mass in the centre gives support to the bridge?

When you have finished your sketches, what will you do with them? Look at them the next day and think how hopeless they are, or forget them altogether? Now, if you will take this piece of advice and mount your sketches, you will be astonished to discover how much better they are than you thought. This will be very encouraging.

Take two L-shaped pieces of card about 12 in. by 15 in. with the bars about 3 in.



PLATE XXV B

COMPOSITION DIAGRAM OF "THE AVENUE" BY HOBBEEMA

wide, Fig. 61. Using these as masks, fit them round your sketches. Shift them about until the best picture is made from your sketch, bearing in mind good compositions. Try less sky, or less foreground. Sometimes a sketch will be improved if it is reduced in size, or even cut in half. One sketch will sometimes make two good pictures, that is, in the case of landscapes and seascapes.

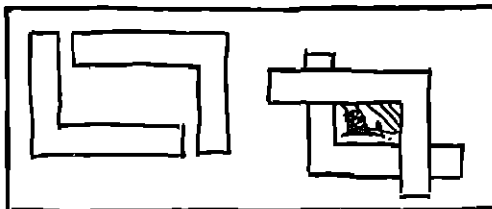


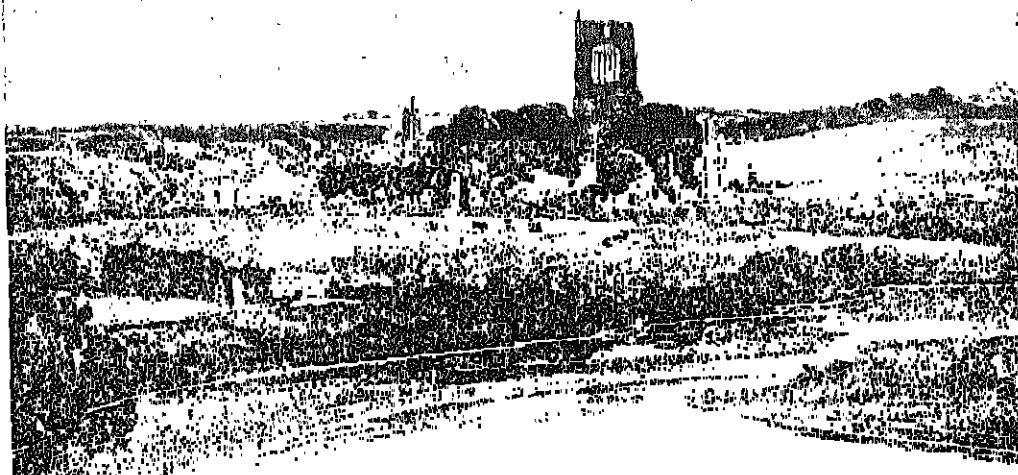
FIG. 61. L-SHAPED MASKS OF CARD USED IN DECIDING SIZE AND SHAPE OF MOUNTS

Generally it is best not to retouch sketches away from the model, but sometimes a little judicious touching up, or washing out will improve the picture.

When you have decided on the actual size of the picture you will need some card, or stiff paper, on which to mount the sketch.

Choice of colour of the mount is the first consideration. The mount must not fight the colour of the sketch, but must, so to speak, flatter it. Pencil, pen or monochrome sketches may be mounted on tinted or white card, or paper. Dark, rich, full-coloured sketches may have white mounts. The contrast along the edge of the picture must not be so great as to detract the eye from the sketch. White is usually safe for a mount.

When arranging the picture on the mount,



After the painting by T. Girtin in the Victoria and Albert Museum]

[Photo: W. F. Mansell]

PLATE XXVI A

KIRKSTALL ABBEY, YORKSHIRE—EVENING

great judgment must be exercised to decide on the best proportion for size of mount to size of picture. There should be more space at the bottom than at the top of the mount, Fig. 62 A-B.

A simple mount can be made from a single sheet of the desired card, or paper, cut to a suitable size. Trim the sketch to the decided size and paste it along the upper edge to the mount.

Another type of mount can be made from a sheet of stiff paper, folded so that it forms a hinge at the top. In one half, cut a rectangular aperture to the size of the picture. The sketch is stuck, uncut, by the upper edge inside the mount. This type of mount is useful for trying sketches, Fig. 62 C.

Your best sketches may be framed in plain wood frames. Other simple frames can be made from card and glass, both

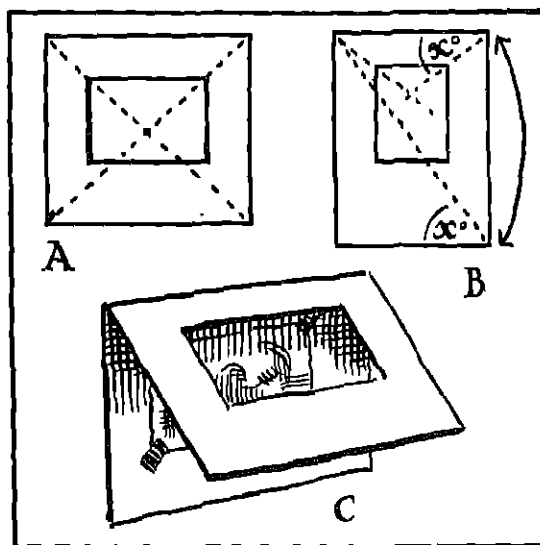


FIG. 62. MOUNTS

A and B, Using the diagonal lines when deciding the proportions of the margins.
C, Hinged type of mount showing sketch stuck inside.

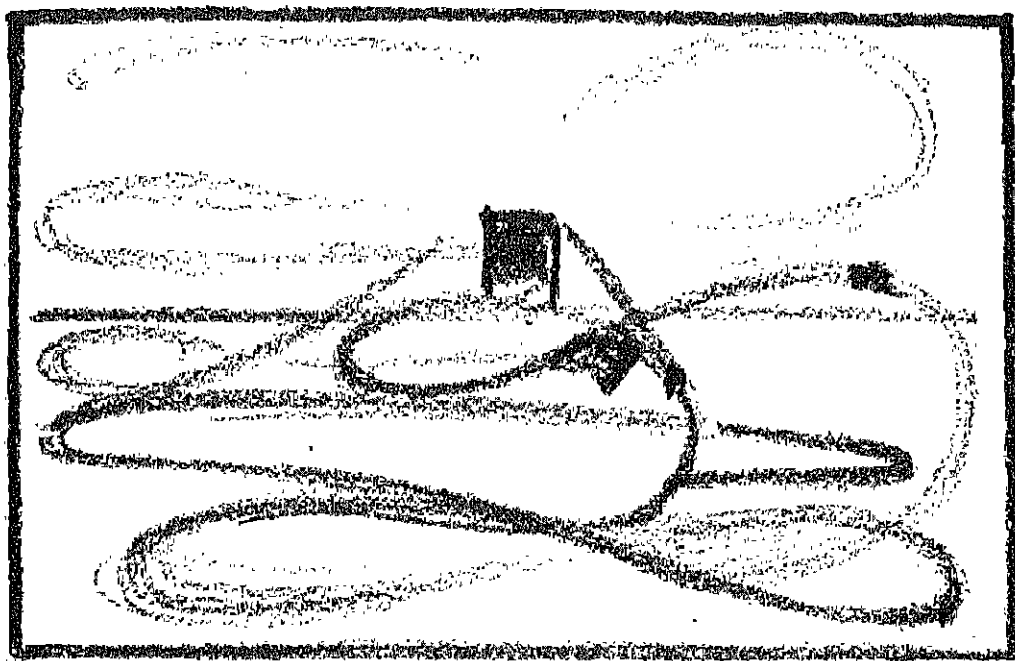


PLATE XXVI B

COMPOSITION DIAGRAM OF "KIRKSTALL ABBEY" BY T. GIRTIN

cut to the size of the mount. Place the glass in front of the picture and the card at the back of it, then bind together round the edges by gummed linen, or passepartout tape. When hanging pictures for exhibition, they should be comfortably placed so that the horizons of the sketches are as near as possible on a level with the eyes. There is nothing more foolish, or unpleasant than pictures hung high up on a wall, in which case the beholder has to strain his neck and view the pictures from an awkward angle.

Teaching hints.—Composition is a misleading word; it means more than "putting together to form a whole." That could imply carelessness. Composition means harmonious pattern consisting of proportion, balance, rhythm, and a quality that is often overlooked, fitness to purpose.

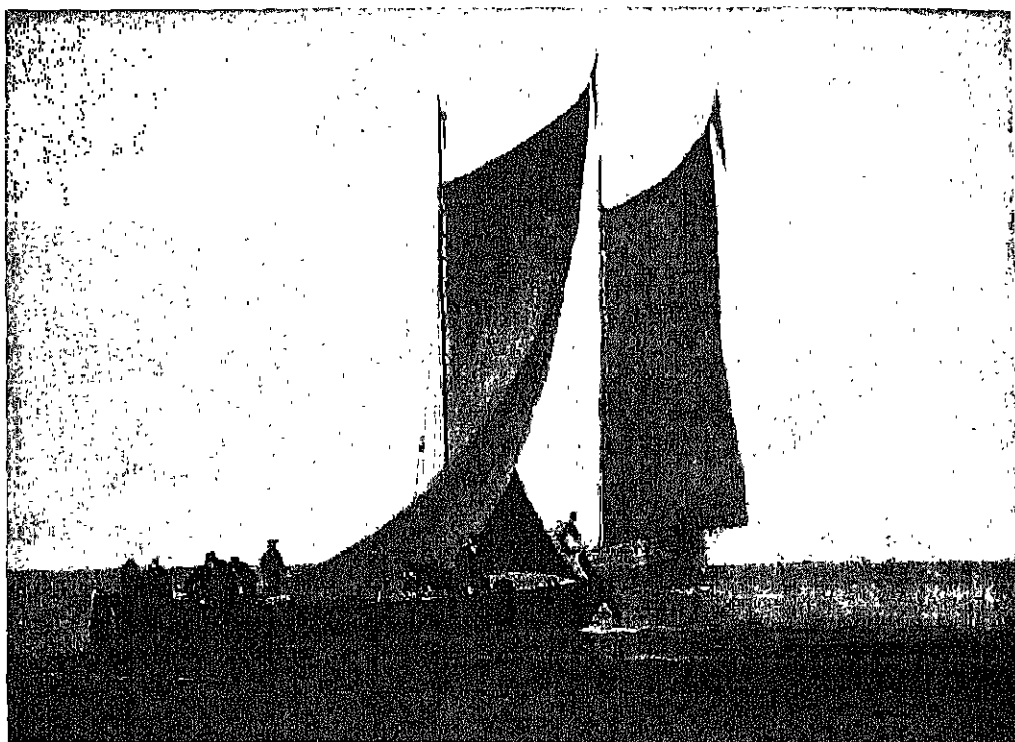
Good composition cannot be obtained by imitating nature in an unconsidered way. Sketching, like all other art, necessitates

forethought and design in planning out the picture.

A study of the composition in the pictures by Old Masters will be helpful, but these must not be copied. Originality must be encouraged, no matter how weak the result is. Originality can be made to blossom under careful guidance.

Good practice in trying out various combinations of mass, tone and line will be obtained in the making of composition-patterns, as suggested in the chapter. Black and white should be used first, then half-tones and finally colour.

Good compositions will have a simple plan of main tone masses. These will have good proportion in the weight of tone and in the size of mass. The whole pattern will have balance of tone and contrast. The main masses will be bound together by long rhythmic lines along which the eye will be led to the climax, or centre of interest in the picture.



After the painting by John Sell Cotman in The National Gallery]

[Photo: W. F. Mansell]

PLATE XXVII A
WHERRIES ON THE YARE.

A bad composition is one that is spotted. It will have several disconnected masses, or points of interest, each so equally attractive to the eye that they will break the unity of the whole picture.

In drawing, it has been advised not to over-emphasise lines, nevertheless, lines will appear definitely, or suggestively, along the edges of the masses. These lines must not be allowed to isolate shapes, Fig. 59 A.

The practice and appreciation of composition will add extra interest to the observation of everyday life. A realisation of the importance of arrangement and unity should go beyond pictures into daily life and help to broaden the mind in the direction of the need for harmony, proportion, balance and rhythm.

With regard to criticism in general, while it is important for the teacher to be aware

of and to be able to point out good examples, special ones must not be praised up to the point of favouritism. Select merits from each and every one, so as to give some encouragement to all. Even bad sketches will have some good points, while often the most obviously good sketches may have faults. Unfair criticism is deadly, encouragement is galvanic.

When exhibiting sketches, the best sort of background to use is of neutral-coloured sheets of paper, or cheap hessian.

The classroom walls may be used as a background if they are suitably coloured—that is, neutral. Otherwise, the paper or hessian can be hung by means of pins or tacks from a picture rail. If it is not practicable to hang the pictures on the walls, screens may be used. These should be approximately 6 ft. high and can be

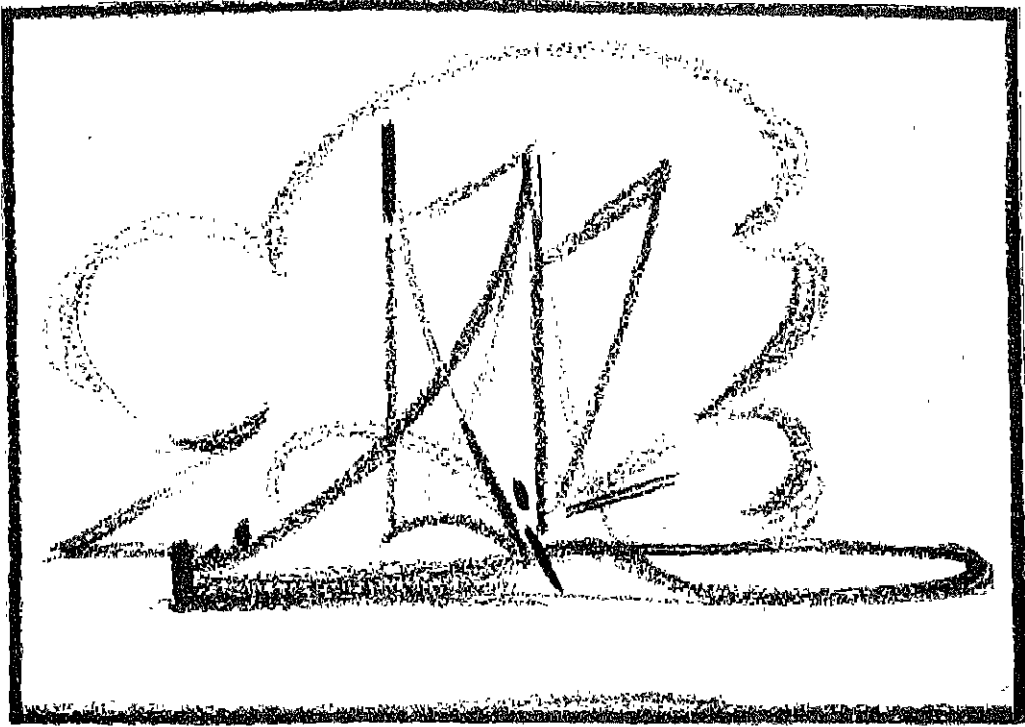


PLATE XXVII B

COMPOSITION DIAGRAM OF "WHERRIES ON THE YARE" BY JOHN SELL COTMAN

constructed quite simply of 3 in. by 1 in. wood battens covered with hessian. They can be so made as to fold flat and will not take up much room when stored away.

Pictures should not be hung higher than 5 ft. and not lower than 2 ft. from the floor. The ideal position is one in which the picture is hung so that the horizon is seen on a level with the beholder's eyes.

The sketches may be exhibited framed or unframed, but in either case they should have carefully selected mounts, both as regards colour and proportion. The frames, if used, had better be plain wood or in a neutral colour such as gold, grey or black. Cellophane or transparent celluloid can be used instead of glass in the frames.

A sketching club may be formed so that opportunity can be given for the children

to criticise each other's work and to co-operate in arranging exhibitions.

The possibilities of such a club are manifold. Its programme may include out of school activities in the form of country rambles, social gatherings and debating societies—the latter may discuss such things as the importance of art and design in everyday life, and naturalistic and decorative art and so on.

The entries for the club can be classified as follows:—Animals; Architectural Studies; Birds; Common Objects (trees, plants, fences, etc.); Figures (quick time studies, action poses, etc.); Landscape and Seascape. Each section must be divided into the following sub-sections:—Pencil, Chalk, etc.; Pen and Ink; Water Colour. Another section for decorative works could be included to cover lino-cuts, stencils and hand painted work.

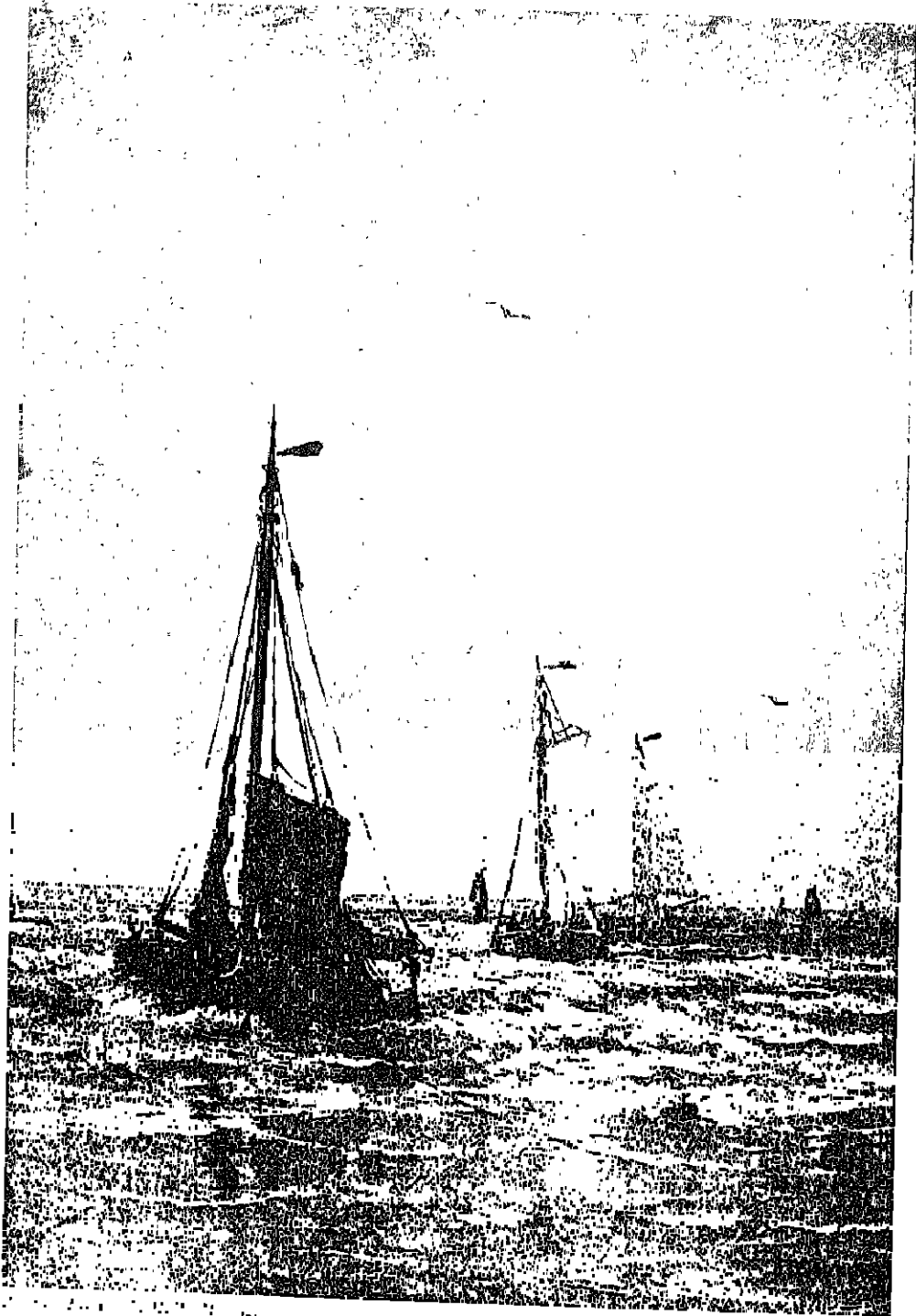


PLATE XXVIII A
A SEASCAPE

[Photo : W. F. Mansell]

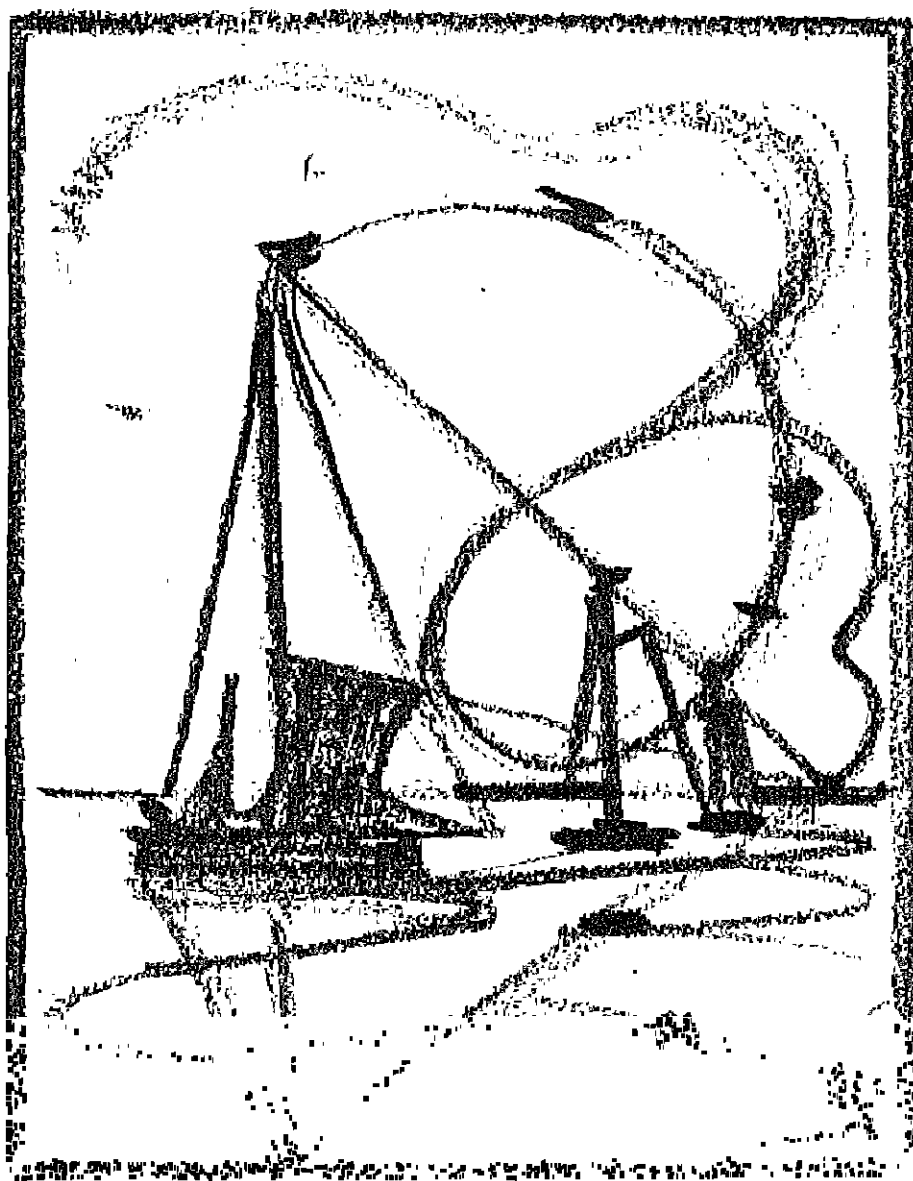
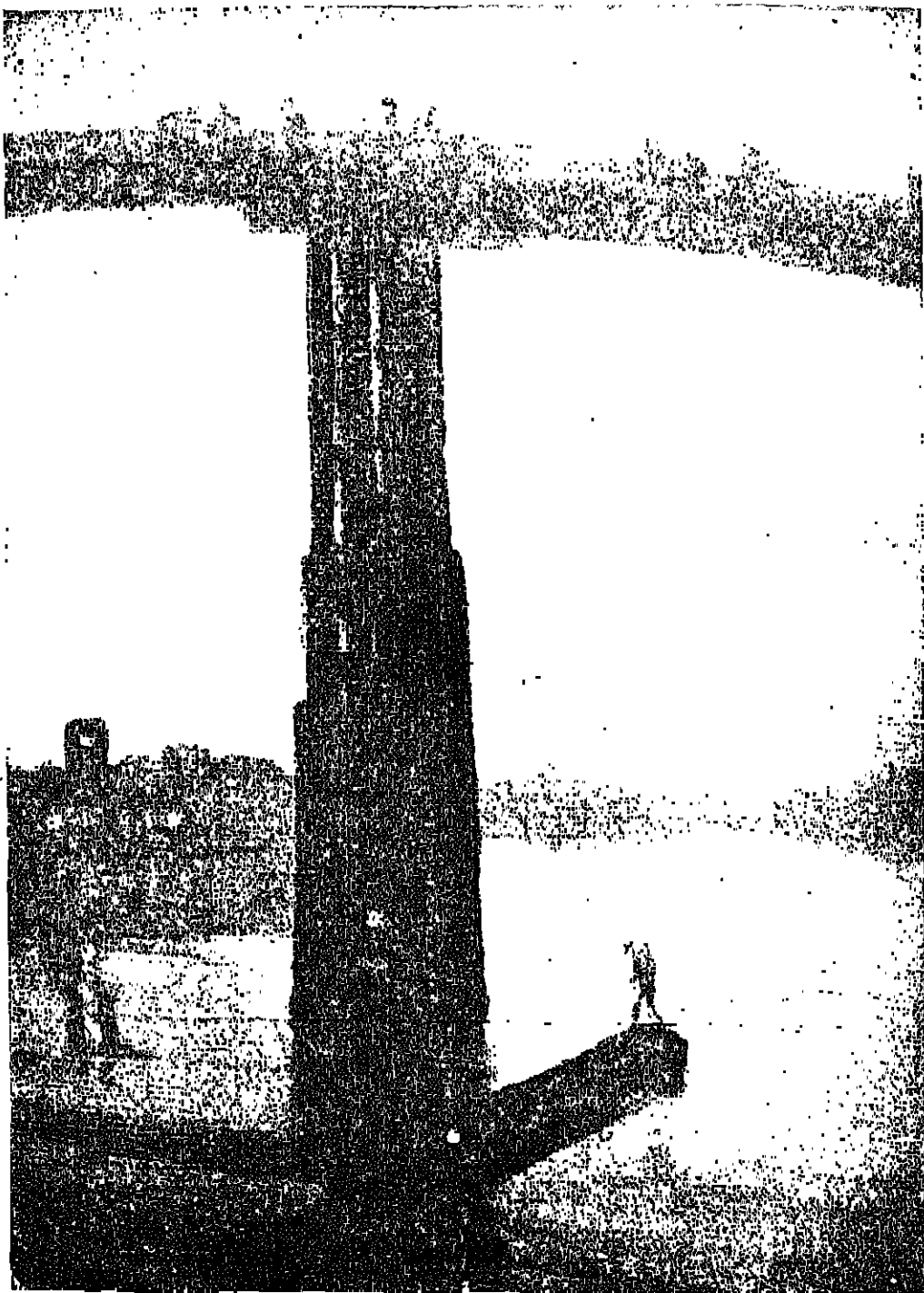


PLATE XXVIII B
COMPOSITION DIAGRAM OF "A SEASCAPE" BY H. W. MESDAG



After the painting by Whistler in the Tate Gallery]

[Photo : W. F. Mansell

PLATE XXIX A
OLD BATTERSEA BRIDGE

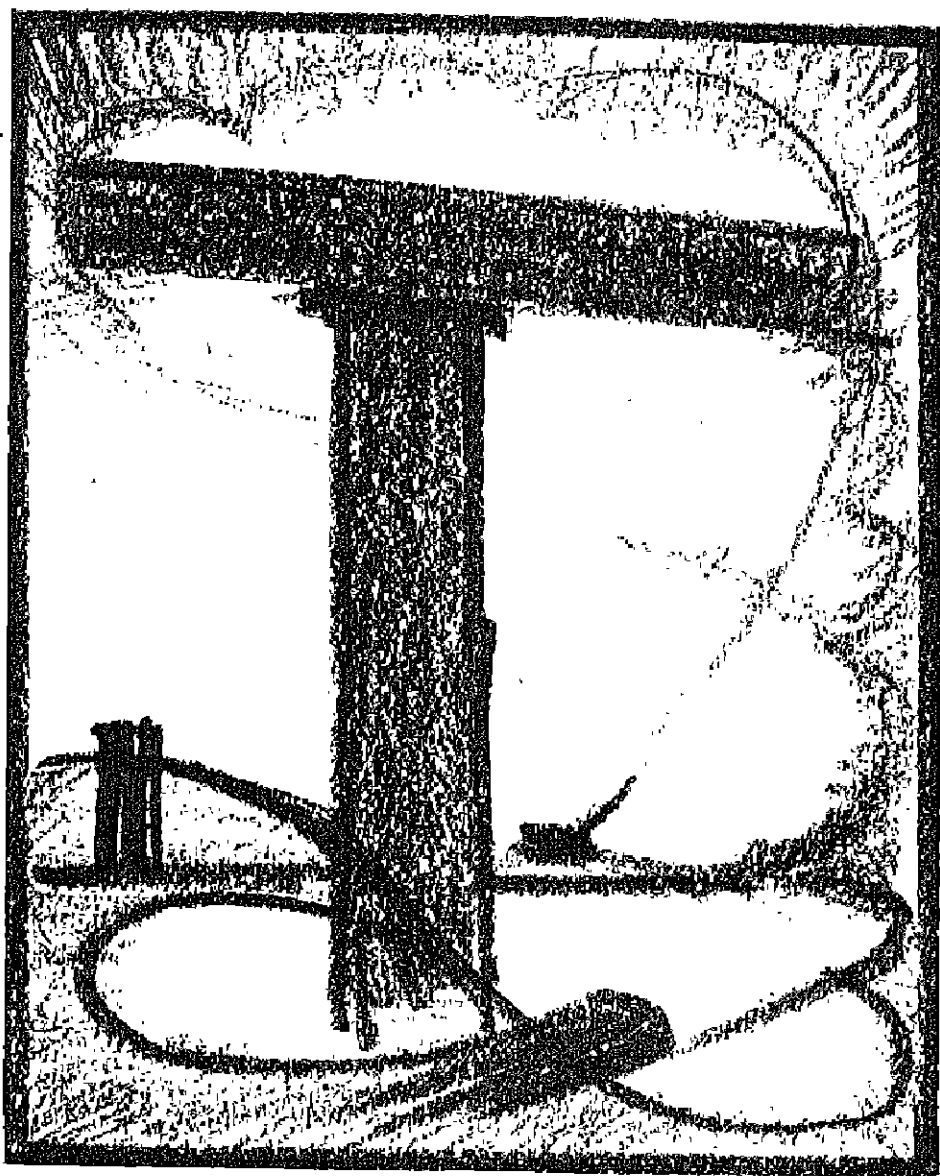
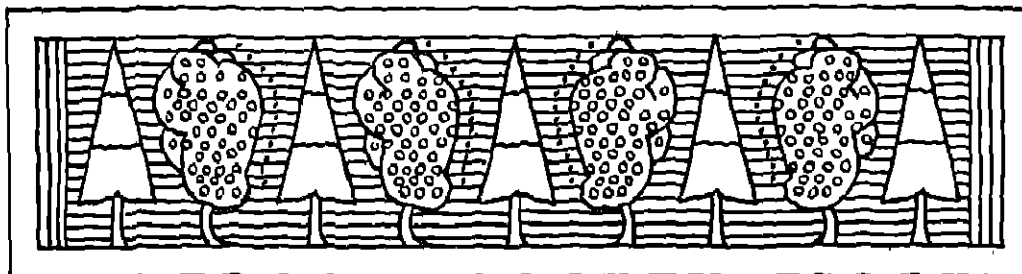


PLATE XXIX B
COMPOSITION DIAGRAM OF "OLD BATTERSEA BRIDGE" BY J. McNEILL WHISTLER

VIII. THE APPLICATION OF SKETCHING TO DESIGN



Your sketches will offer much useful material that can be employed in designs for such things as greeting cards for Christmas and Easter, calendars, covers of books and school magazines. Trees, animals, figures, ships, sea waves and houses can be used in the designs. They can be used singly as decorative motifs, as pattern units, or in groups as decorative pictures.

Now, when you make a design for such a thing as a book cover or a greeting card, certain points have to be considered.

First point:—Your design must be suited to the purpose for which it is being created. You must realise that the design is going to decorate a flat surface—the card, paper, or cloth of the cover, or greeting card. The decoration or pattern must be in harmony with the flat surface of the card. Decoration, to harmonise with a surface, should echo the nature of that surface, such as curved lines on a rounded surface (Fig. 63 A) and straight lines on a flat surface, Fig. 63 B. Your design must have a maximum of straight, or straightish lines and flat treatment of colour. It is best not to worry too much about light and shade or perspective, because they immediately give the effect of depth: but if these are shown they must be used as part of the decoration and not naturalistically, or accidentally. It may perhaps be safe to say, omit these effects altogether.

Second point:—Your design must be suited to the method by which it is to be produced. For example, if it is to be printed as a lino cut, you must take into consideration the fact that it will have to be cut, or gouged out of the lino; then in-bed; and printed on paper, or cloth. The design must, therefore, be one that is easy to cut and must not look like anything except a lino cut (Fig. 64 A); not a pen sketch (Fig. 64 C) or a brush drawing, Fig. 64 B.

Third point:—Your design must be beautiful. If it is practical it will have beauty, but you must decide that it shall be beautiful from the beginning of its creation.

So now you can see that there are three very definite points to bear in mind when you make a design. First, purpose of production—how will it be used? Second, method of production—how will it be done? Third, beauty of production—how will it be seen?

Let us consider the first point more fully. How will it be used? For a Christmas greeting card, you must realise that its main purpose is to convey greetings—cheery greetings. For that, you want bright colours, simple, contrasting shapes, circles and curves. Gaily coloured scenes, flowers, balloons, merry figures and simple jolly patterns, can all be used. There is no reason why the designs should consist only of snow

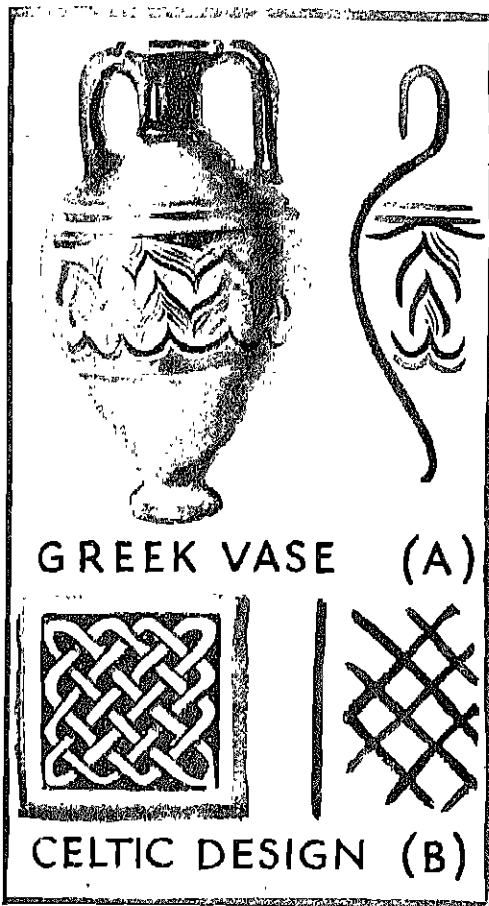


FIG. 63. DECORATION IN HARMONY WITH THE SURFACE

A. Curved lines on a rounded surface.
B. Straight lines on a flat surface.

scenes, Christmas trees or Father Christmasses and holly, Pl. XXX.

For Easter greeting cards, simple shapes and attractive patterns of bright harmonious colours can be used. Animals, birds, flowers and so on can be used as the *motifs*. Perhaps less bright, or contrasted colours will be needed, for it is now no longer winter; spring flowers have come to brighten up Eastertide.

In each example, the size of the design will be regulated by the size of card and the amount of space to be filled. The size of the design in that case is usually to be

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determined with regard to the proportion of decoration to space left. The card will be held in the hand so that a margin should be left round the edge of the card. This margin will serve the double purpose of protecting the decoration from thumb marks and of making the decoration more elegant. The margin is not so important if an all-over pattern is used to decorate the entire surface of the card.

Perhaps some lettering will be put on the same surface as the decoration. This must be well shaped and readable. It must harmonise with the decoration—in fact it had better be considered as part of the design.

Calendars are needed to supply information of months, weeks and days. That is their prime purpose, hence the decoration must not obscure that purpose. Calendars also have to be looked at for a whole year! They must, therefore, be pleasant and friendly. Bright, cheerful colours and simple, pleasing decoration in the form of patterns, or a picture are the best. The whole calendar must be harmonious; the proportion of the calendar tablet—bearing the list of months and days—and the decoration must be considered with the amount of background or margin showing round them.

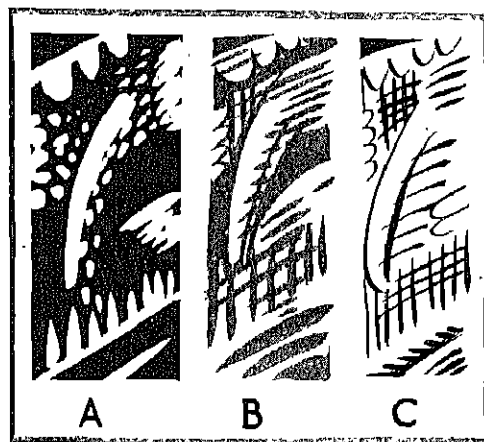


FIG. 64. CHARACTERISTIC TEXTURES

A. Lino cuts.
B. Brush strokes.
C. Pen lines.

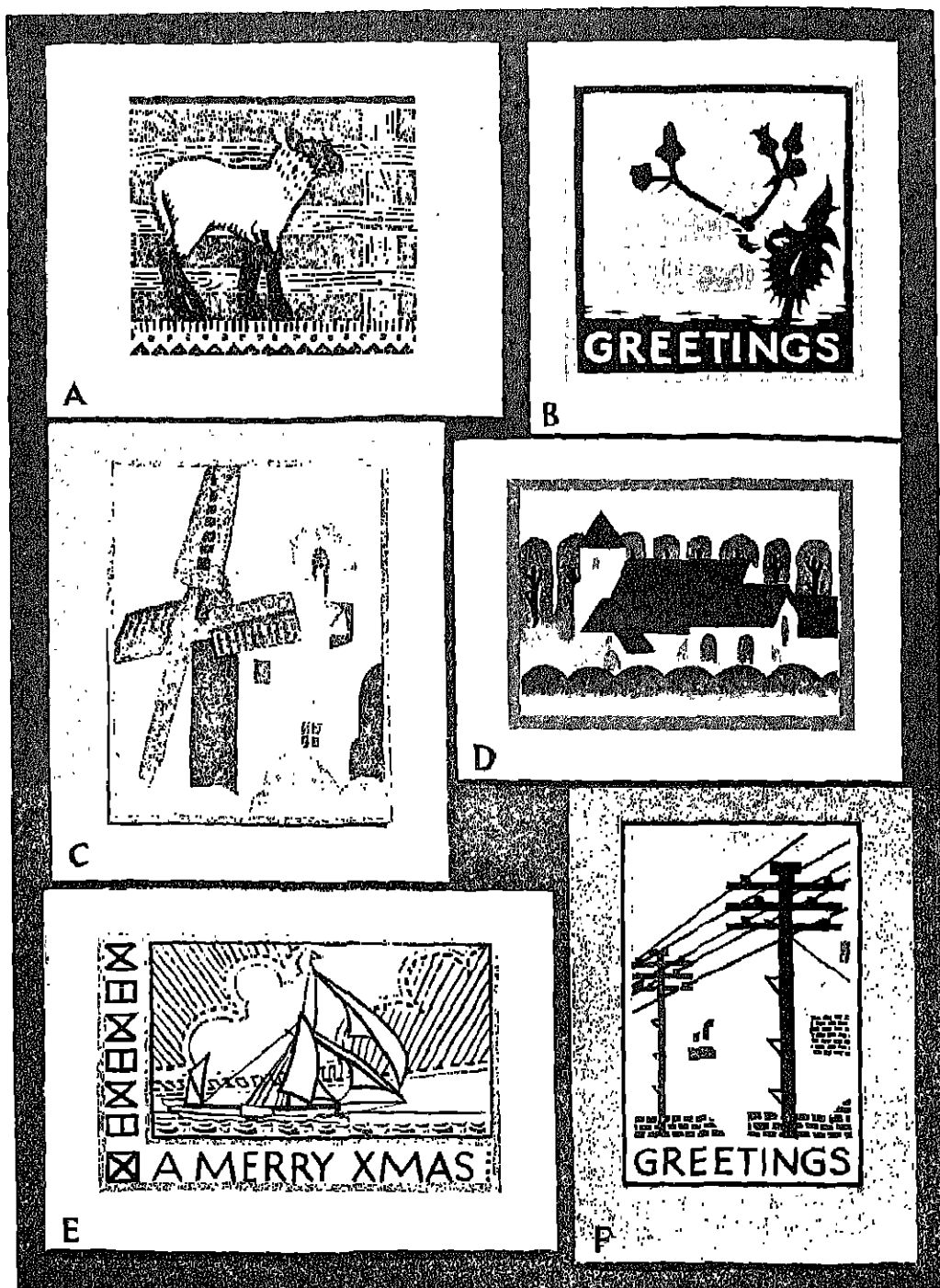


PLATE XXX
SIX CHRISTMAS CARD DESIGNS

- A. Hand painted design.
C. Lino cut design.
E. Hand painted design making use of brush strokes.

- B. Lino cut design.
D. Stencilled design.
F. Hand painted in body colours.

The calendar is either hung by means of a loop, or made for standing on a desk, in which case it will need to be made of stiff card with a supporting flap at the back.

Decoration on calendars may bear no relation to the year, or months, but the seasons of the year do suggest themselves as subjects for decoration. One suggestion for a calendar is to have a separate sheet and design for each season—spring, summer, autumn and winter—or month as it comes, or is torn off.

The purpose of the cover of a book, or magazine, is to indicate the nature of the contents. In that case, any decoration that is put on the cover ought to bear some relation to the contents of the book. The title must be taken into consideration and be given a place on the cover. The nature of the book's binding must be considered and the decoration must be harmonious with it, both with regard to position, size and colour. Some sort of margin may be left round the edge of the book so that the decoration is preserved from thumb marks.

Notebooks should have decoration based on the contents, such as mountains, peoples of different races, maps, ships for geography; animals, birds, plants, insects for natural history.

School magazine covers may have decoration based on something of interest connected with the school, such as a playing field or even a view of the school buildings. Or the decoration could be based on some object, or place, suggested by the name of the school, such as trees for *Woodland School*.

Now let us consider the second point in detail. How will it be done? First of all there is hand production, in which case your design may be rendered with either pen, or brush in one colour on a white, or coloured, ground. Black or coloured inks for pen work and body colour—poster colour—for brushwork should be used.

Hand production does not impose many limitations on your method of treatment, unless they be in the form of the limitations

of pen line and brush stroke. Your treatment must be simple in any case.

Now this is where your sketches come in. You can use them as material, source of information or inspiration, for your designs. Choose the sketch suited to your purpose, Pl. XXXIA. You may even bear that purpose in view when you make your sketch. Next, the sketch must be redesigned, or parts of it used as decoration.

Copy out the sketch, simplifying the shapes, lines and colours, Pl. XXXIB. Your object is to create a decorative *motif*, or picture, based on natural form, but not naturalistic in treatment.

Shapes may be exaggerated to assist design so long as they are not distorted, or made ugly. When you use objects, such as figures and trees, think of them as symbols, not as naturalistic representations. Perspective, light and shade can safely be ignored. The scale and proportion of objects as seen in nature need not necessarily be adhered to. Thus, a tree, for example, may be simplified into a purely geometric shape with an edge pattern. It may be filled with an all-over pattern of leaves, or kept flat, without any reference to roundness of form or scale of leaves to tree. Textures of surfaces, such as bricks, tiles, waves, wood-grain and foliage may be employed as pattern in decoration.

If your design is that of a decorative picture, the composition of the parts may be symmetrical, or otherwise. Your knowledge of picture composition will help in the space filling.

Single objects may be selected from any one sketch and have *motifs*, or pattern-units based on them. Units of a pattern must be rather simple in shape and colour.

When it comes to the actual painting, or drawing, first plan out the shapes and lines of your design in pencil, Pl. XXXIIA. Your decoration may then be filled in with one, or more, colours, using line alone, or flat patches of colour, or a mixture of the two. If you use a brush, the brush strokes may be considered as part of the design.

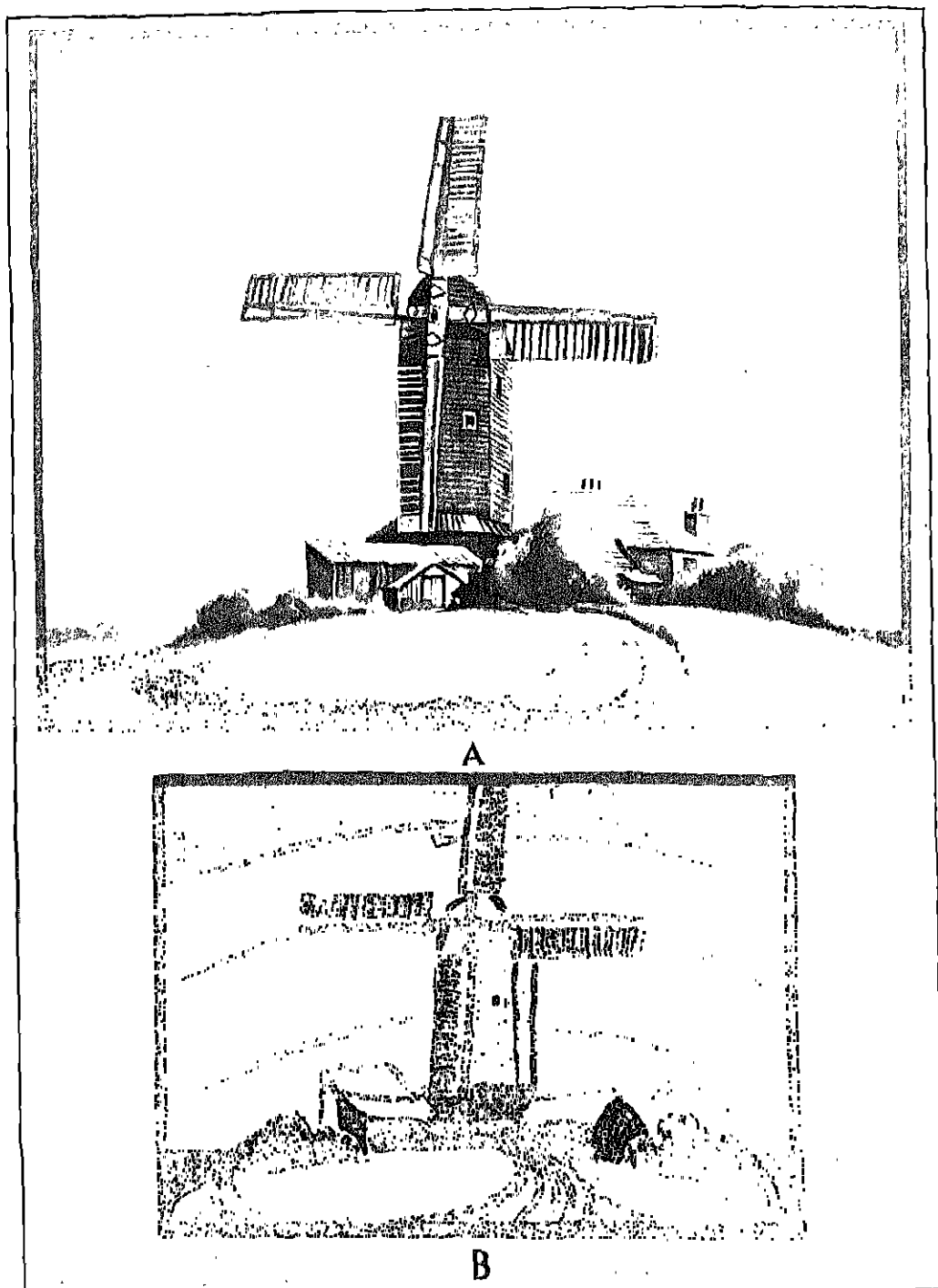
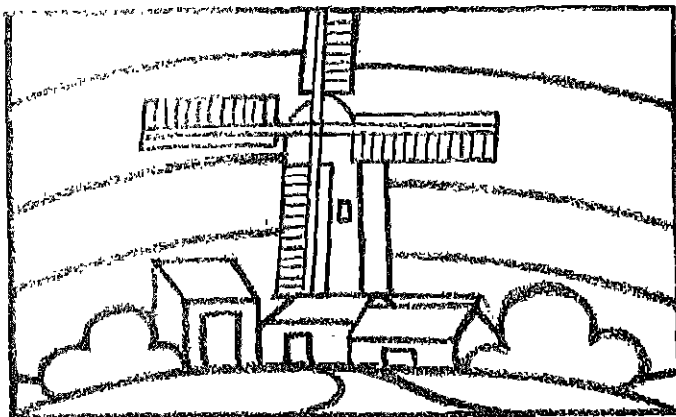


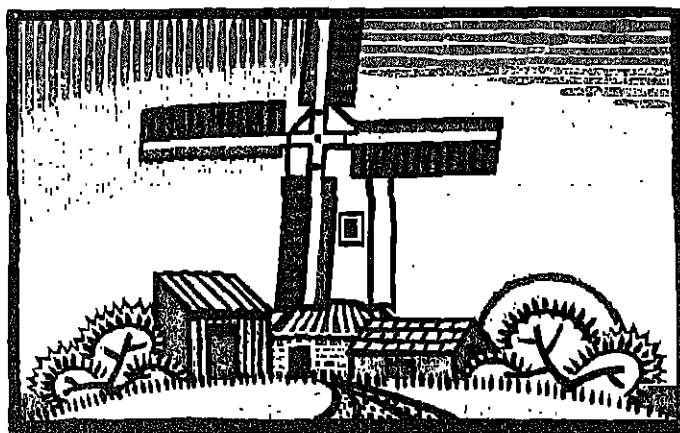
PLATE XXXI

USING A SKETCH AS THE BASIS OF A DESIGN—PART I

- A. The original sketch.
- B. Rough translation of the sketch, with shapes, lines and colours simplified.



A



A MERRY CHRISTMAS

B

PLATE XXXII

USING A SKETCH AS THE BASIS OF A DESIGN—PART 2

- A. Pencil plan—this in itself would make a suitable line decoration to be carried out in colour or monochrome.
- B. The finished Christmas card with the design painted in poster colour.

The colours used need not necessarily bear any relation to those of the original sketch, or to those seen in nature. Try to make your design and treatment as original as you can, Pl. XXXII B.

Now, if you are wanting to reproduce the same design many times, it will be best to print it by means of lino cuts, or reproduce it by means of a hectograph or by stencils.

Designs for lino cuts should consist of simple masses with details and textures discreetly used, Pl. XXXIII C. Fine lines should not be used, because if the lino is left as fine ridges it will probably soon break away and will not print, or if fine lines are cut in the lino they will rapidly fill up with ink and cease to print.

Design your decoration, using masses and fairly sturdy lines. Then transfer it wrong way round to the lino and cut it, allowing the tools to interpret the shapes and lines quite naturally and easily. Do not try to make the objects look naturalistic. Decoration, simplicity, originality, must be your motto.

Colours should be simple—red, yellow, blue, grey, green and so on. By overprinting red, yellow and blue, several other colours can be produced. Again, the colours used may be entirely imaginary or based on the original sketch, but, of course, simplified and symbolic—red for roofs, blue for sky, green for grass and so on. Do not attempt to reproduce the accidental changes of colour as seen in nature, unless they are simplified and used definitely as pattern, or as part of the design. For example, the sea in nature may be seen to vary in wave pattern and colour to such a degree that it appears as a patch of many gradated colours. In design, it may be symbolised as a pattern of regular white wave shapes on a blue ground, as a flat area of colour, or as a pattern of clearly defined masses of flat colour.

Your lino cut design, then, must have simple shapes and no attempts at realistic "effects" or imitations of naturalistic accidents. The surface to be printed on must be considered. If the lino cut is to be

printed on paper, finer details will be permissible than if it is to be printed on cloth. The amount of fineness in detail will have to be regulated according to the texture of the cloth—finer detail for linen, coarser detail for hessian.

Possibly your school magazines or any other school publication is reproduced by means of a hectograph. In that case the cover design should be treated as a simple pen drawing. No attempt must be made to represent accidents of nature where natural objects are concerned. Broad outline shapes, simple, easily drawn texture pattern and rather severe treatment will be required. You must avoid imparting a thin, stringy effect, and this can be done by using bold rhythmic lines and good proportions of line and shape. Any lettering, or writing appearing on the same sheet as the design must be considered as part of the general scheme and treated as such. Use good, simple shaped lettering that is easy to read.

Redesign your sketch, planning it out in pencil as a decorative outline drawing, keeping to simple shapes and carefully designed pattern, thinking all the time in terms of bold lines.

Your design may also be reproduced any number of times by means of stencils. When you make designs for stencils there is a need for utmost simplicity of shape and no small details, Fig. 65.

First of all plan out your design in pencil, considering only outline shapes. Next, decide what colour, and how many colours you will use. Once again, there is no necessity to keep to the natural colours of objects. As a matter of fact, if the shapes of objects are simplified and made symbolic, the colours should be treated similarly.

Now there are two methods of stencilling, the positive method whereby the shapes of the design are stencilled leaving the background plain; and the negative method whereby the background is stencilled, leaving the shapes of the design plain.

When you make your design for a stencil, sketch out the shapes and lines in pencil

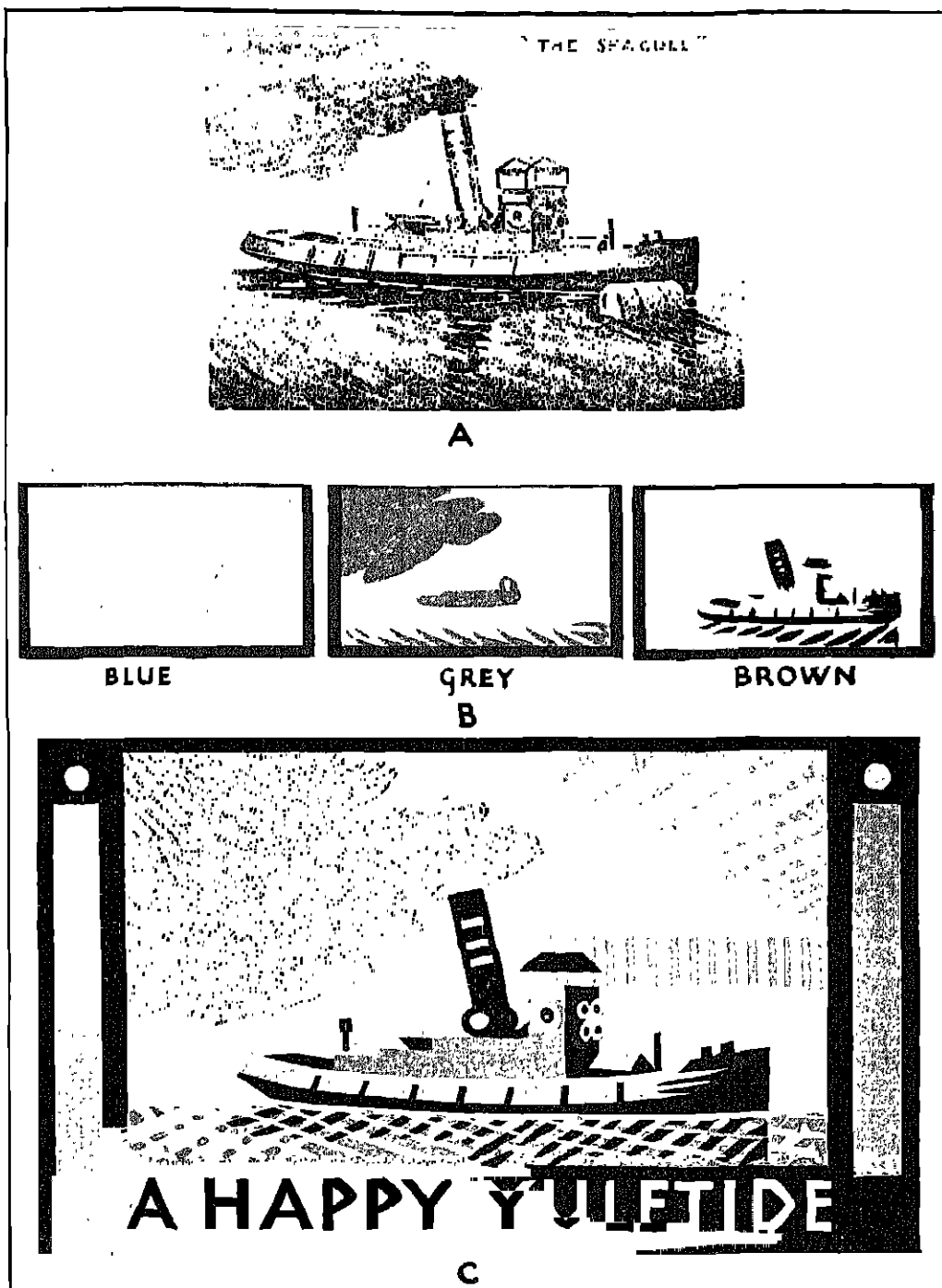


PLATE XXXIII

LINO CUT DESIGN FOR A CHRISTMAS CARD

- A. The original water colour sketch of a Thames tug.
 B. Rough plans to show colours of the three blocks used.
 C. The completed lino cut.

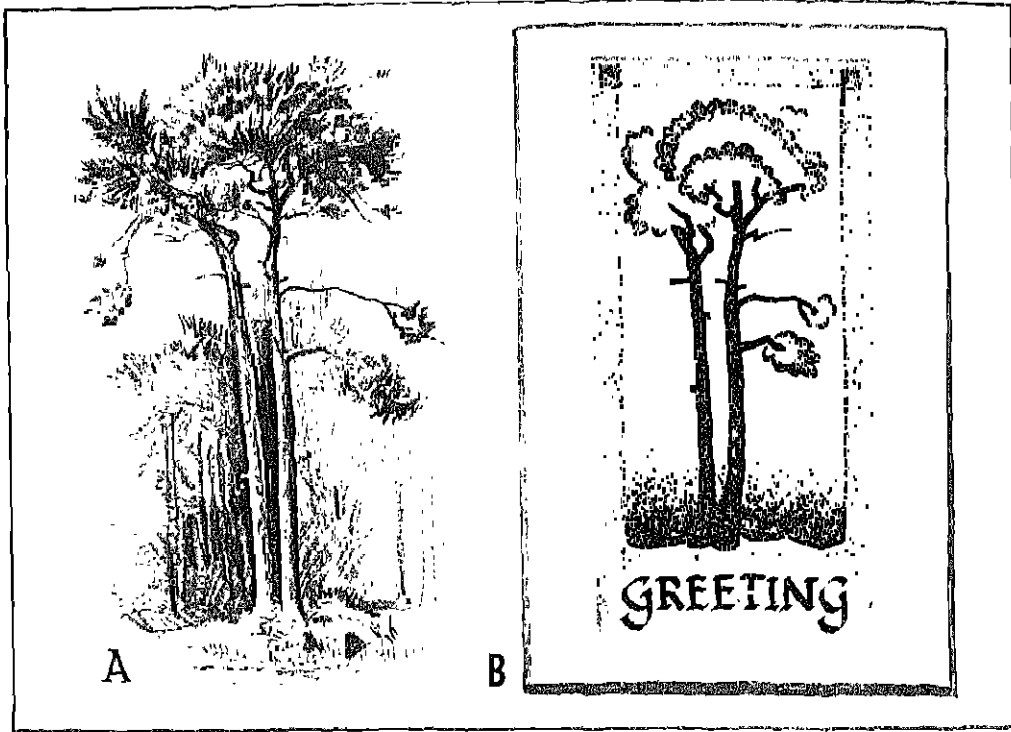


FIG. 65. STENCIL DESIGN FOR CHRISTMAS CARD

A. Original pencil sketch of fir tree.

B. Stencilled design for Christmas card based on the pencil sketch. The lettering added with manuscript pen.

first. The design must be simple and somewhat severe in shape; remember that you will be cutting the shapes out with your penknife, or stencil-cutting knife, so that there must be no difficult twists, or edges of shapes to cut. Straight lines and simple curves are easiest to cut and it is best to keep to these in stencil designs. Lettering is rather difficult to cut.

Your design may consist of edges only, single bold shapes, or a pattern of shapes. In the latter design, the shapes should be separated by a band of equal width, say $\frac{1}{8}$ in. to $\frac{1}{4}$ in. The pattern must be tied together with narrow tie-bands to prevent isolated shapes dropping out. These ties need not be unsightly when stencilled, they should be used as part of the general design.

You may use one or more colours in your stencil and these may be dabbed on by means of brush, sponge, or cloth, or the

colours may be sprayed on by means of a mouth spray such as is used to apply Fixative to drawings, or by means of an air brush. The paper and stencil-plate must be firmly secured during stencilling, and in the case of the work being sprayed, the board to which it is attached must be sloping.

Flat patches of colour can be used. If a gradated effect is produced it must be used as part of the design and not as an attempt to reproduce accidental lighting effects. Remember that the object of your stencils is to enrich a flat surface and not to imitate nature, or create an illusion of raised form. Think in terms of simple shapes, straight, or curved lines and flattish patches of colour.

Now, let us consider the third and last point of design. How will it be seen? Your designs must be seen to be beautiful. You must decide on that from the beginning.

Try as hard as you know how to produce your designs as well and in as good taste as possible. There is no reason why all your designs should not be beautiful, if you exercise a certain amount of forethought and good judgment.

When you made your sketches out of doors in the country or by the sea, you tried to record your impressions of the beauty of nature. If your sketches were successful, they should have been pleasing to the eye because of two things: firstly, they depicted natural beauty with feeling, and secondly they were well done.

Now, natural beauty is, for the most part, accidental—a question of lighting and position. For example, sunshine can make ugly things look beautiful in certain positions and at certain distances; unpleasant colour can appear beautiful when softened by atmosphere, or in certain lights.

The beauty of your designs is quite another matter. When you create a design, you are making something new for some definite purpose. It may be for either a greeting card, a calendar, or a book or magazine cover. If your designs fulfil their purpose and are well done—painted, printed or stencilled—they will have artistic beauty of their own. Therefore, there is no reason why you should imitate natural beauty in your designs.

When you use your outdoor sketches as material for decoration, do not imitate the accidental beauties of light and shade, but take the shape of such things as trees, clouds, animals, or waves and use them symbolically, allowing the character of the method of reproduction—lino cut, stencil, etc.—to influence the treatment in an honest, reasonable way.

Here is how a decorative picture was designed and painted on a Christmas card. A sketch made last summer was used to furnish material for the design. In the sketch was a chestnut tree in bloom. This was used.

First of all, a faint pencil draft of the design was made. The shape of the tree was

simplified to fill the oblong picture space pleasantly. In the sketch the tree was a somewhat irregular square shape with broken edges. In the design, the tree was given a more regular, simple shape and this was placed so that it filled the picture pleasantly and so that there was a good proportion of tree mass to background space. The trunk was used almost as it was in the original sketch, except that the lines were simplified. The tree was planted on a curved mound of just the right proportion to the rest of the parts of the picture.

The tree was filled with a regular pattern of leaves—care being taken to symbolise the shape of the chestnut leaves and flowers—you know those lovely piles of pink or white chestnut flowers. The edge of the tree was broken by a regular leaf pattern, with one large and two small leaves used alternately.

The picture was painted in poster colours. The sky was made a pale, warm grey. The leaves were painted sea blue, or turquoise green and the flowers were made pale pink. Each shape was carefully separated by a band of pale grey—the same as the sky. The tree was edged with emerald green, care being taken to preserve the leaf pattern.

The trunk was painted pale brown. The grass mound at the bottom was made the same green as the edge of the tree. To finish the picture off, a border of pink and grey—the same as those used in the picture—lines were painted round the edge.

When you use bright, rather contrasting colours, a neutral colour, such as grey, gold, or black will render the scheme more pleasing.

A lino cut design was created as follows. A sketch of a windmill on a hill was used as a source of inspiration. The shape of the picture was drawn on paper. This was painted in as a solid patch of black—Indian ink can be used for this. The design was planned out with a pencil line. The shapes were used, simplified. The mill was drawn decoratively—sails, building and doors and windows were kept in their same places as those in the original sketch, but more

severely drawn. The composition of the sketch was kept, but modified a little so as to form larger masses of unbroken black. The cut-out shapes were next painted in with white poster paint. The sky was shown as a white space designed to balance the contrasted black mass of the mill and the hill. The whole design was considered as a balanced pattern of black and white. White shapes to be cut out were added here, or blocked out there as the design proceeded, so as to increase the good proportions of black to white.

At last it was finished and then it was transformed on to the lino block. The black parts of the design were painted in with Indian ink to form a guide. Then the parts not to be printed were gouged out. The tools were allowed to translate the design in their own way. Only the most important white shapes were cut out at first, because once cut, the lino cannot be put back again! After a proof was printed, a little texture, carefully thought out, was gouged out from the body of the mill to give the right balance to the pattern and then it was ready to be printed in dark green, blue or black.

Finally, here are some design reminders:—

1. Your design must have fitness. That is, it must be suited to use, position, materials and methods. Think of the fitness of design as seen in nature. The giraffe which is tall so as to reach the leaves from the palm trees which are its food; the seeds of the dandelion which are like little parachutes blown along on the breeze and so scattered far and wide to produce fresh plants.

2. Your design must be original. Do not copy other peoples' designs. Do not imitate decoration as used in other crafts and produced by other methods. Use your own imagination and good taste. Think of new designs for new things.

3. Your design must be simple. No ornament is better than too much ornament. Do not "show off" in your designs by making grotesque forced shapes and lines. Try to build up your designs with easy, simple shapes and lines with good proportion

and pleasant colour. Where you base your ornament on natural forms do not distort them, or imitate them realistically, but simplify the shapes and lines.

4. Your design must be honest. For example, your stencilled decoration must be quite frank and admit itself to be a stencil, not pretend to be something else, such as a water colour painting. Your figures, trees and other objects must be purely decorative and not imitations of nature.

Teaching hints.—It will be useful to consider the previously discussed outdoor sketches as studies made prior to making designs. It is always wise to go to nature for inspiration. Study her beauty of design. The lovely shapes of clouds and waves, the rhythmic lines seen in plants and landscape, the patterns of space and mass, their balance and proportion, as well as the glorious colour to be seen everywhere.

The information thus gathered can be applied to design. This application must not be a mere copying, or distorting to the requirements of space filling. It must be a translation by way of purpose, position, material and method into something in the nature of a symbol. This is so in all the best styles of decorative art, such as Egyptian, Greek and Japanese, Fig. 66. It would be useful to show examples of—and perhaps

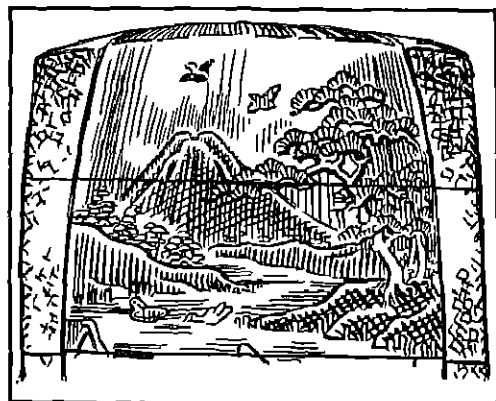


FIG. 66. THE UPPER HALF OF A JAPANESE MEDICINE CASE DECORATED IN RAISED LACQUER WORK

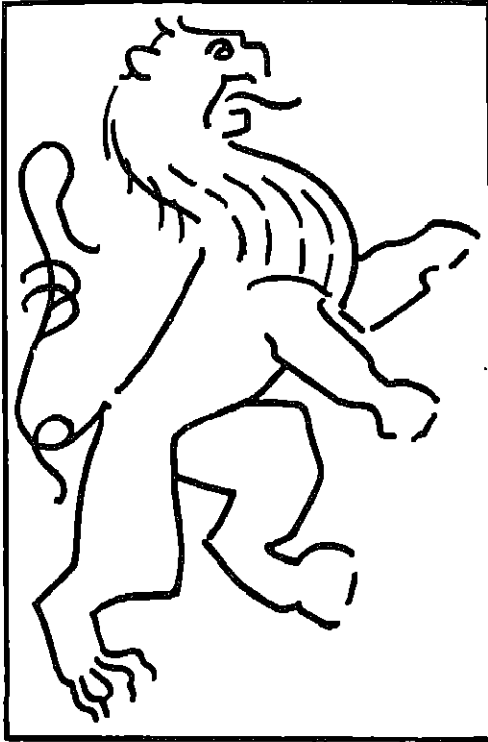


FIG. 67. THE LINES OF AN HERALDIC LION,
ENGLISH, 1636

to permit coloured copies to be made of—some good specimens of Heraldry of the twelfth and thirteenth centuries. The study of this art is of value to all students of design. The early work is of particular beauty, being both simple and vigorous in colour and treatment. The animals both real and imaginary are worth studying for their design and simplicity of treatment, Figs. 67 and 68.

Teach honesty in design. The ornament must be subordinate to the materials and method. An understanding and appreciation of what constitutes good design is a most necessary part of art education. The observation and expression of beauty as seen in nature is one thing, the creation of beauty in design is quite another. The former is creation of illusion—perspective is employed to create an illusion of distance. The latter is creation of reality—greeting cards,

calendars and book covers have real purposes to fulfil.

Now it is reasonable to suppose that any decoration must be submissive to and in harmony with the construction, or production of the article. In each case there is a flat surface to be decorated and this calls for special treatment, both of shape and colour. Good examples of flat surface treatment can be found in Egyptian (Fig. 69) and Early Christian paintings. In these styles of art, the colours are used in flat patches, the shapes are simple and the lines are of a maximum straightness. Curves are not excluded, but are delicate and simple.

It would be very helpful to have one or two good examples of these styles of art to show the class. Choose those that are least grotesque; if possible, of animals, trees, figures and everyday objects, such as furniture. It would be wise to point out the treatment of such things as hands, faces,

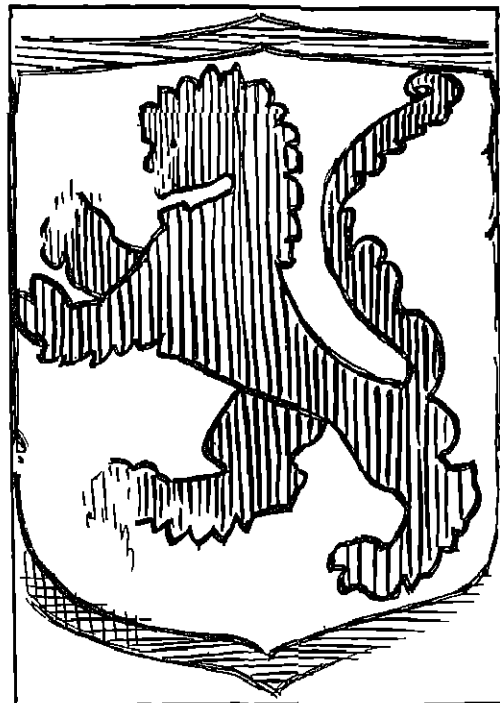


FIG. 68. LION RAMPANT FROM A SPANISH
TILE. BRICK-COLOUR ON A WHITE GROUND,
WITH SEA GREEN BORDER

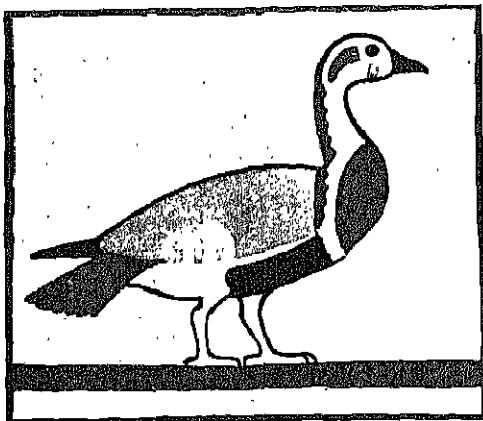


FIG. 69. GOOSE FROM AN EGYPTIAN PAINTING

eyes, leaves of trees, water waves, wood, or any other familiar material, or object as seen in the examples. Any other examples of good decorative art, ancient or modern can be shown (Fig. 70) but avoid displaying anything that is bizarre, jazzy, or ultra-modern to the point where familiar objects are treated in such a way that they are unrecognisable. There must be no misunderstanding of the values of either art, realistic or decorative.

Teach the children to appreciate the value

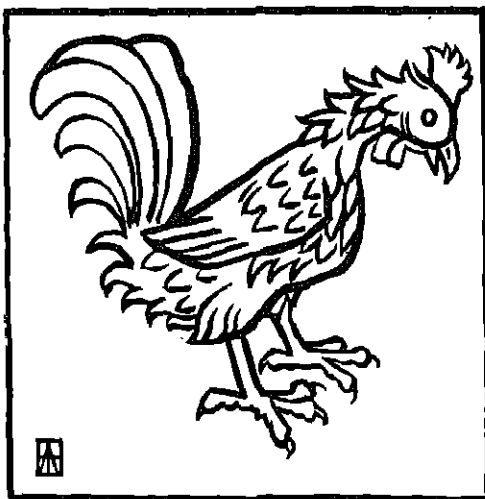


FIG. 70. COCKEREL FROM A WOODCUT, GERMAN, 1479

of simplicity, of restriction of unnecessary ornament even to the point of severity. There are many instances of things best left plain. Decoration for decoration's sake is terrible and taste-destroying. There are the hideous glazed greeting cards with their galaxy of naturalistic flowers and "pretty" thatched cottages surrounded by scrolls and wreaths all made to imitate nature even to the realistically torn edges of the parchment scrolls.

It is safe to suppose that a moderation of shape and line may be balanced by bright, contrasting colours. The proportion of colours one to another should be carefully considered. This is more important than kind of colour. It is easy to introduce a somewhat sloppy use of colour in which badly placed and badly proportioned colours are made to look pleasing to the eye by the use of neutrals, such as grey, or black.

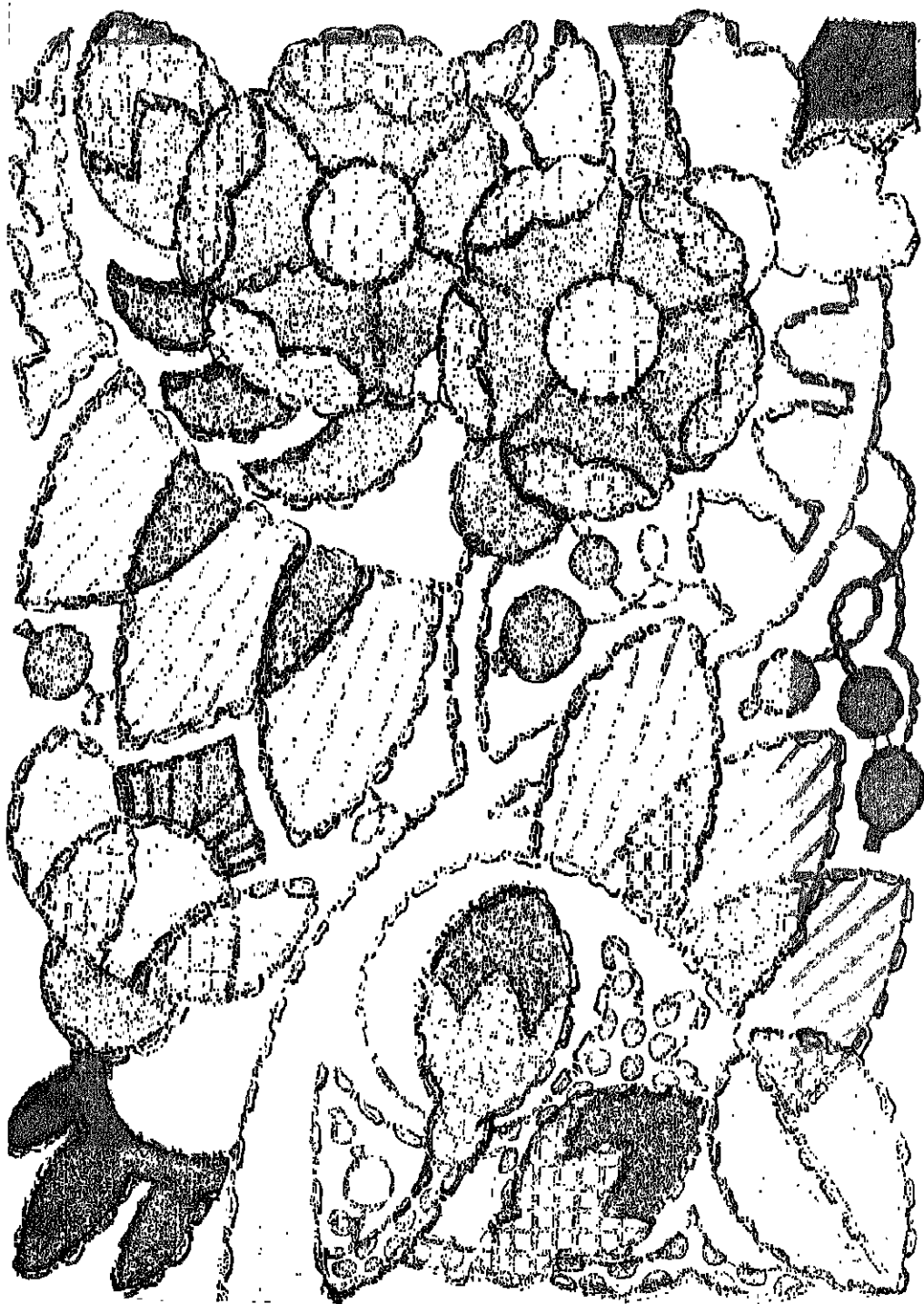
To demonstrate the good use of colour it will be wise to refer to nature. Here such strongly contrasted colours as scarlet, green, orange, yellow and purple are seen in harmony with each other, in a bed of flowers, for example. This harmony is not due to the presence of neutral colours—shade is not neutral, it is full of colour, reflected or otherwise—but to the proportion of one colour to another. Look where you will in nature, this is always so, in animals, birds, insects, plants and elsewhere.

It will be useful to demonstrate this by displaying a plant, or flower with leaves having well-defined colours. At the same time display a chart of the same colours, carefully copied, in equal areas on a white ground. The model should be shown against a white ground as well. The importance of proportion will be clearly shown in this way.

Finally, here are listed the important points of good design:—

1. Fitness to purpose.
2. Honesty of design.
3. Simplicity of shape, line and colour.
4. Proportion of shape, line and colour.
5. Rhythm of shape, line and colour.

**THE MAKING OF PRESENTS
IN NEEDLEWORK**



DESIGN FOR APPLIQUÉ WORK BASED ON THE WILD ROSE

This design should be worked in patterned silk materials applied to a plain silk background.

THE MAKING OF PRESENTS

THIS subject may very successfully be included in, and worked in conjunction with, the needlework scheme of any school. Not only does it provide the pupils with the means of extending and applying their knowledge of decorative stitchery, but it also provides an opportunity for expressing any original ideas the pupils may have on the subject. Present-making appeals to everybody, for, besides being an economical way of providing a friend with a gift, the recipient is far more appreciative of the present when it is the work of the donor herself.

The following article offers suggestions which will meet the needs of pupils who have acquired varied standards of efficiency in the art of needlework. There is no necessity for the teacher to hold rigidly to the suggestions given as regards the size of any article or the material used, as these can be varied to meet the desires of the pupils. Wherever possible, encourage the pupils to make and carry out their own designs.

Pressing is of the utmost importance where decorative stitchery is concerned, and when a design has been worked it must be pressed well on the wrong side (in some cases using a damp cloth) before the article is completed.

TEAPOT OR KETTLE HOLDER

Teacher's requirements.—Two small pieces of crash; two pieces of flannel or old woollen material; sheet of drafting paper; coloured wools; needle; scissors; thimble; pattern; completed Kettle Holder; coloured pencil; pins; blackboard or chart with illustrative sketches.

Children's requirements.—Two pieces of linen, crash, or artificial silk $5\frac{1}{2}$ in. square; pieces of flannel or old woollen material;

embroidery silks or wools; needle; scissors; thimble; sewing cotton; pencil; piece of tape $\frac{1}{2}$ in. wide; piece of drafting paper; pins.

The pattern.—Cut out on the drafting paper a square with side $4\frac{1}{2}$ in.

Cutting out.—

1. Place the pattern on the material and cut out, allowing $\frac{1}{2}$ in. turnings.
2. Using the same pattern, cut out two squares of flannel without allowing turnings.

Making up.—

1. Lay one flannel piece to the wrong side of a material piece, fold the turnings over on to the flannel, and using ordinary sewing cotton, catch-stitch them down to the flannel without letting the stitches show on the right side, Fig. 1.

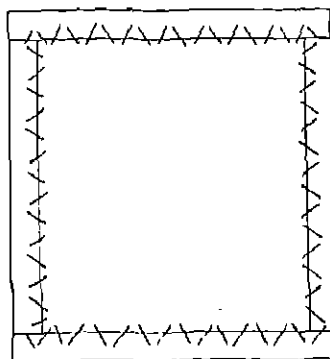


FIG. 1

2. On the right side of the material, from half way along each side, measure 1 in. at right angles to the side towards the centre. Join all these points to form a square, marking lightly with a pencil or tailor's chalk.

3. Work over these lines with running stitches in coloured silk or wool, and $\frac{1}{4}$ in. inside these lines work another line of running stitches, the stitches falling alternately with those of the first lines.

4. Join the ends of each stitch of one row to the ends of each stitch in the second row with vertical tacking stitches in another colour of silk or wool to form the design shown in Fig. 2.

5. Work over the construction lines with running stitches, filling in the spaces with crossed slanting tacking stitches, Fig. 2.

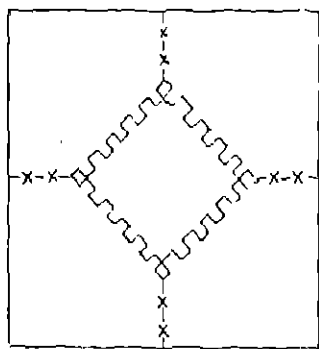


FIG. 2

6. Fix and work the second material and flannel squares in the same way.

7. Make a tape loop as follows:—

Cut a piece of $\frac{1}{2}$ in. wide tape 5 in. long. Turn a narrow fold on each end of the tape and fold the tape over as in Fig. 3. Place the wrong side of the tape to the corner of one square on the flannel side. The ends of the tape must be placed $\frac{1}{4}$ in. in from the corner along the diagonal, Fig. 4. Hem along the three sides with sewing cotton, and where the two sides of the tape meet,

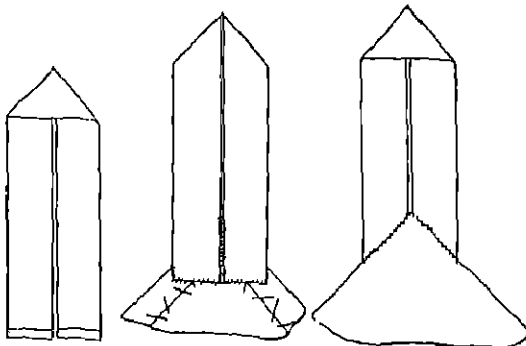


FIG. 3

FIG. 4

FIG. 5

join them with sewing stitches, Fig. 4. Fold the tape back and sew it along each side of the corner of the square, Fig. 5.

8. Place the two squares together, flannel to flannel, and tack round the outside edges.

9. Join together the edges of the two squares with blanket stitching in embroidery silk or wool, making the stitches alternately long and short, Fig. 6.

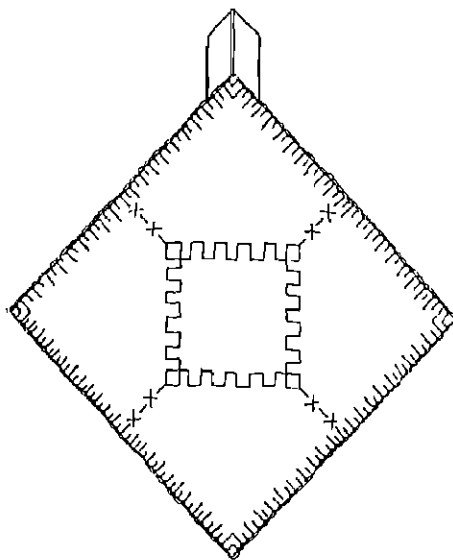
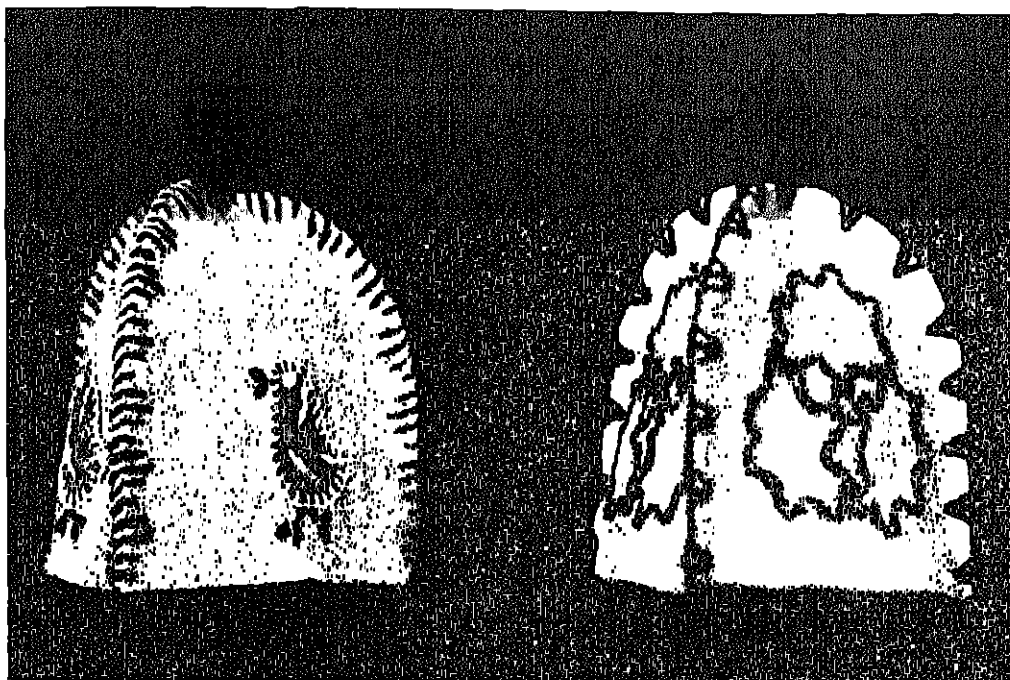


FIG. 6

EGG COSIES

Teacher's requirements.—A piece of hessian; a set of Egg Cosies showing the different methods of joining the sections, and embroidered with different designs; drafted pattern of the Egg Cosy; enlarged pattern; coloured wools; needle; scissors; thimble; coloured pencils; blackboard or chart showing sketches of the grouped blanket stitches and threaded back stitch; blackboard; drafting paper; ruler.

Children's requirements.—Pieces of coloured felt cloth; coloured embroidery wools; needle; scissors; thimble; pencil; drafting paper; ruler.



EGG COSIES

The pattern.—

1. Draw an oblong ABCD, $2\frac{1}{2}$ in. by 3 in. AE = EB; AG = GD; BF = FC.

2. Join EF and EG with curved lines, Fig. 1. Cut out on the pattern lines.

Cutting out.—Place the pattern on the felt and cut out on the pattern lines. Cut three pieces of felt for each Cosy.

Making up.—

1. In the centre of each piece of felt draw a design such as is suggested in Fig. 2.

2. Outline the design with the coloured wools in threaded back stitch, which is most effective as a decorative line, Fig. 2.

To work the threaded back stitch.—Work a row of stitching along the traced lines. Using another colour of wool, pass the needle up under one stitch and down under the next stitch, continuing thus until all

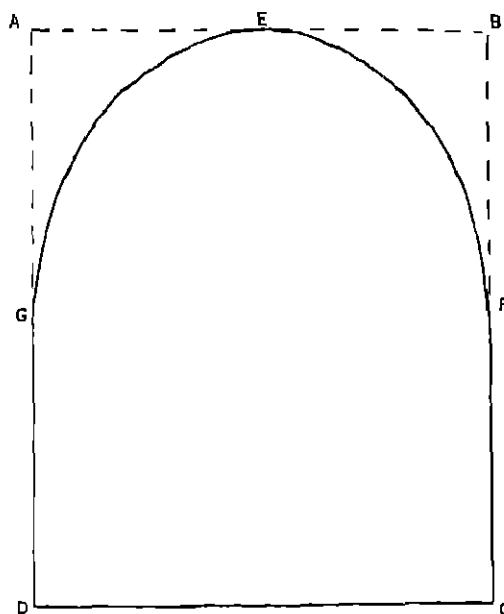


FIG. 1

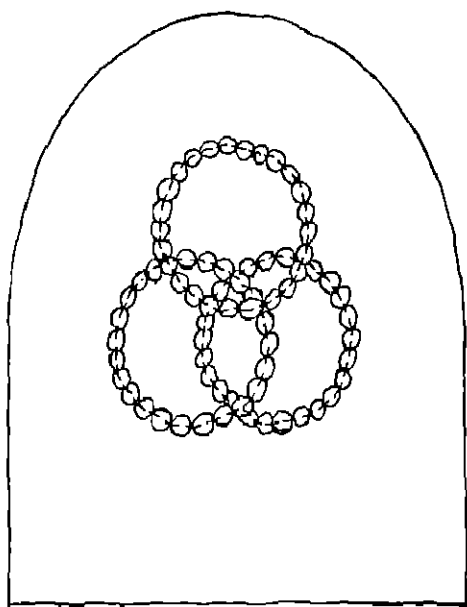


FIG. 2

the stitches have been threaded, Fig. 3. Thread another colour of wool under the stitches in the reverse direction if desired, Fig. 4.

3. Place the three pieces of felt in position to form the Cosy and blanket-stitch the edges together with the wools, working the stitches in groups of three, each stitch of which passes through the material at the same point, Figs. 5 and 6. Another method

of forming the Cosy is first to blanket-stitch the edges as in Fig. 7, afterwards oversewing the edges together through the blanket stitches, only with another colour of wool, Fig. 8.

4. Make a tuft of the coloured wools as follows:—

Cut several lengths of wool, each about 2 in. long. Lay them all together and tie them firmly in the centre with a fairly long piece of wool, the ends of which are left hanging, Fig. 9. Fold all the strands of wool together and tie them firmly again about $\frac{3}{8}$ in. up from the base, threading the ends of the tie in towards the centre to form part of the tuft, Fig. 10.

5. Attach the tuft to the Cosy as follows:—

Thread the loose ends through a needle and pass through the apex of the Cosy, afterwards passing them two or three times through the base of the tuft, and the apex of the Cosy, and end by tying them in a firm knot inside the Cosy, Fig. 11.

HOT WATER BOTTLE COVER

Teacher's requirements.—A piece of hessian; Hot Water Bottle Cover; hot water bottle; pattern; coloured wools; coloured material; needle; scissors; thimble; coloured pencils; blackboard or chart showing illustrations of various *motifs* for appliqué work; a blackboard; drafting paper; ruler.

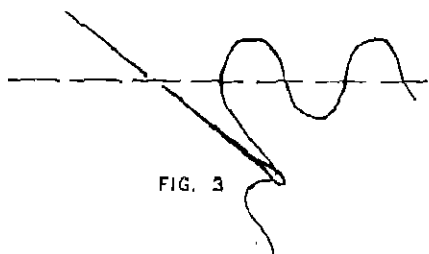


FIG. 3

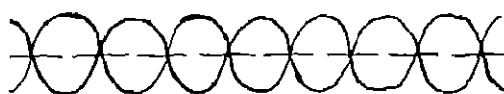


FIG. 4



FIG. 5

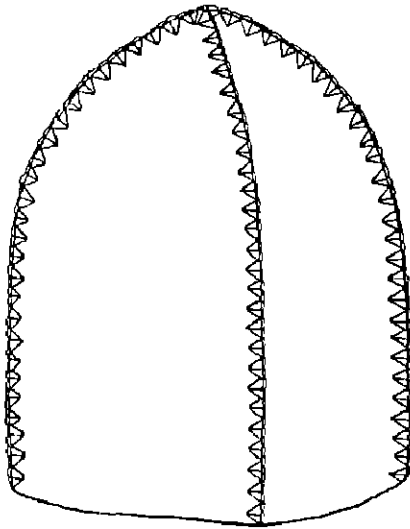


FIG. 6

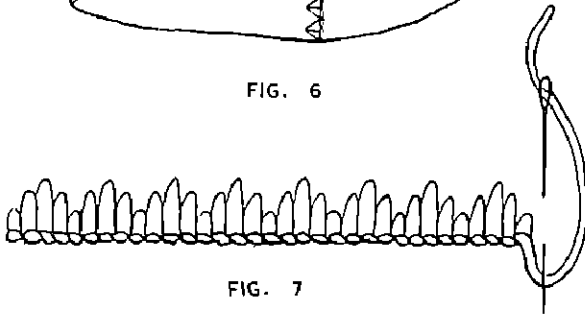


FIG. 7

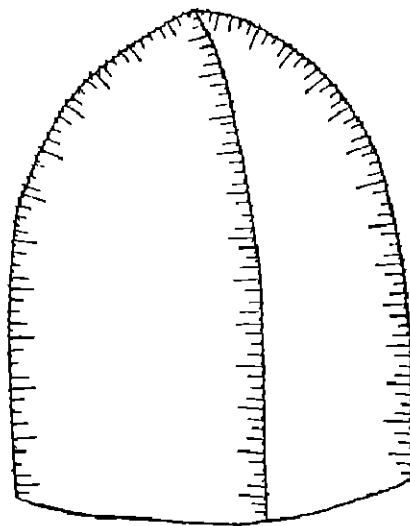


FIG. 8

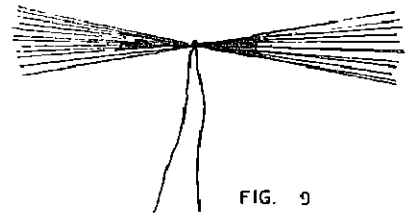


FIG. 9

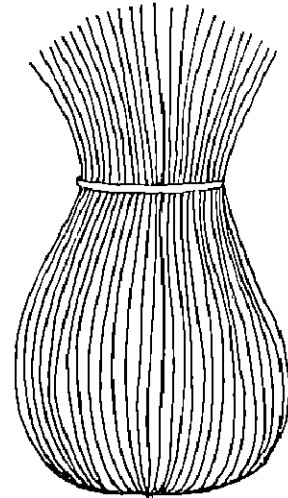


FIG. 10

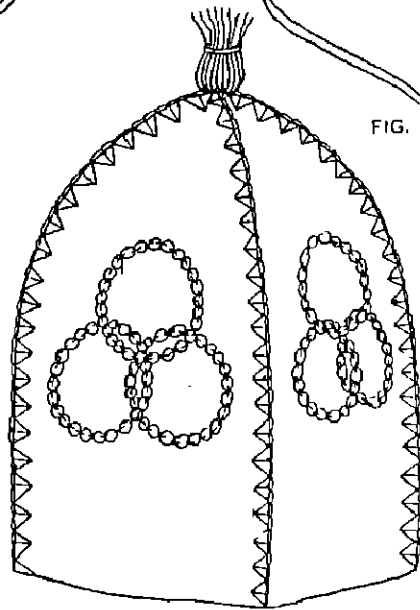
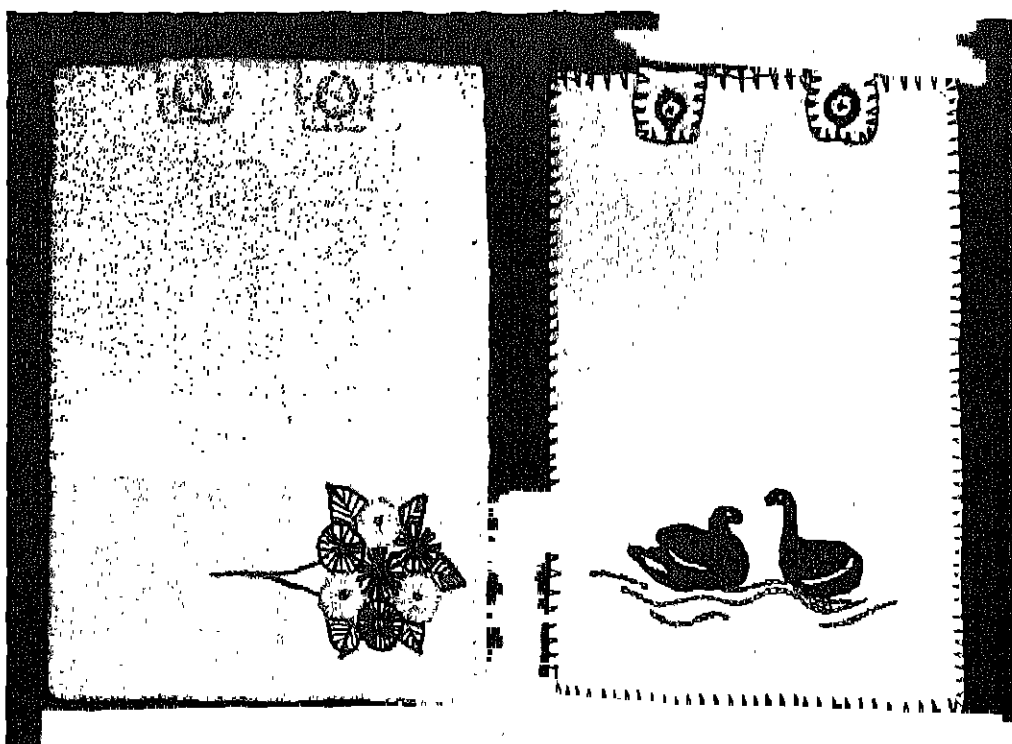


FIG. 11

Egg Cosy



HOT WATER BOTTLE COVERS

Children's requirements.—A hot water bottle; ruler; drafting paper; pencil; scissors; two pieces of felt cloth large enough to take the pattern; small pieces of felt cloth in other colours for a *motif*; embroidery wools or silks; needles; thimble.

The pattern.—

1. Measure the width and length of the bottle (not including the funnel-shaped neck), and draw an oblong ABCD. AB = the width plus 2 in.; BC = the length plus 2 in., thus allowing plenty of space for the bottle to be inserted when filled.

2. Mark the position of the neck EF, along the line AB.

3. On each side of the centre of AE and FB measure $\frac{3}{4}$ in. and on these bases complete the squares as in Fig. 1. Cut out on the pattern lines.

Cutting out.—

1. Lay the pattern on the felt cloth and cut out one piece close to the pattern lines.

2. Turn down the small square flaps flat to the pattern, lay the pattern on the felt cloth, and cut out a second oblong piece close to the pattern lines.

Making up.—

1. On one oblong piece of felt cloth, work an embroidered design or a *motif* in appliqué. The latter may take the form of a floral design or, if the bottle is for use in the nursery, an animal or bird would be more suitable. Make the pattern of the *motif* first in paper. The "free cutting" method is ideal for providing the pupils with a means of producing an endless variety of patterns suitable for appliqué work, such as flowers; leaves; figures; animals; trees; fruit, etc. For the flower, cut out a square with side

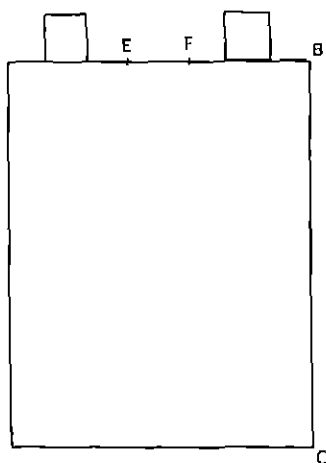


FIG. 1

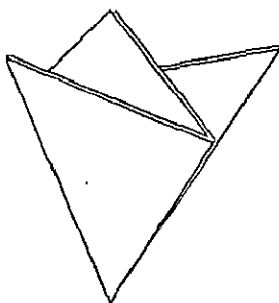


FIG. 2A

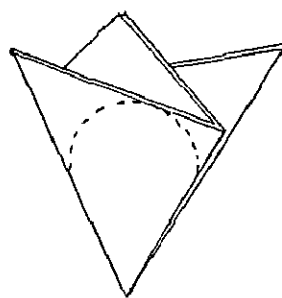


FIG. 2B

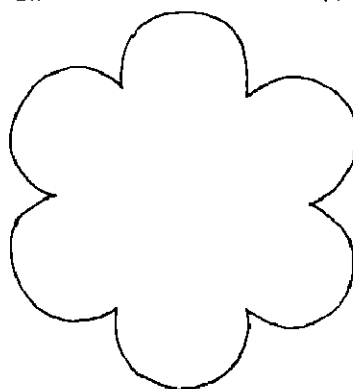


FIG. 2C



FIG. 3A

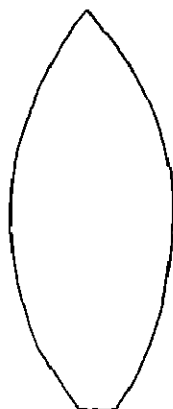


FIG. 3B



FIG. 3C

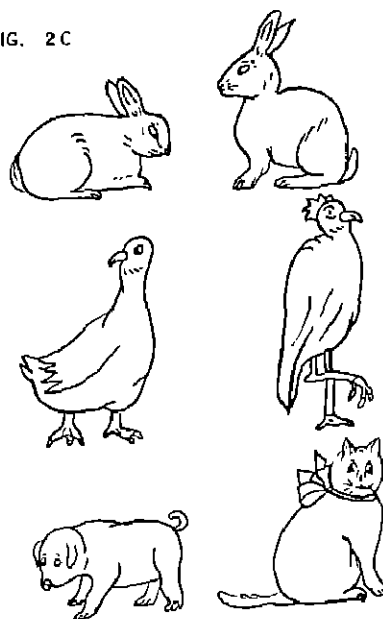


FIG. 4

HOT WATER BOTTLE COVER

about $2\frac{1}{2}$ in. Fold diagonally, then fold the triangular shaped piece again into three equal parts, Fig. 2A. Cut round the outside edges in the shape of a petal, Fig. 2B. Open out the paper, when the *motif* shown in Fig. 2C will be obtained.

For the leaf, cut out an oblong about $2\frac{1}{2}$ in. by 1 in. Fold lengthways in two equal parts and cut round in the shape of a leaf as in Figs. 3A, 3B and 3C.

For animals such as a "bunny," a duck, or a chicken, the pupils bring their imagination into play, and, recalling pictures seen in story books, cut out shapes of animals in various positions, as in Fig. 4. These forms are made more realistic by the aid of stitchery after the *motif* is applied to the material.

2. Place the floral *motif* on the felt cloth as in Fig. 5, and using coloured wools apply it to the felt by one of the methods previously taught.

3. Join the leaves and flowers by a stalk worked in stem stitch.

4. Fill in the centre of the flower with rows of small chain stitches, and the veins of the leaves with stem stitches.

5. Blanket-stitch the upper edges of both pieces of felt with alternating straight and slanting loop stitches.

6. Place the two pieces of felt together, wrong sides facing, and join the sides and lower edges together with the same alternating loop stitches, leaving a portion in the centre of the lower edges unjoined to allow the part of the bottle containing the eyelet to pass through, Fig. 6.

7. On each "flap" work a buttonhole, and on the second piece of felt sew a button to correspond. Make the buttons from the shapings of the felt by cutting out three or four circles of felt the size required, placing them on top of each other, and blanket-

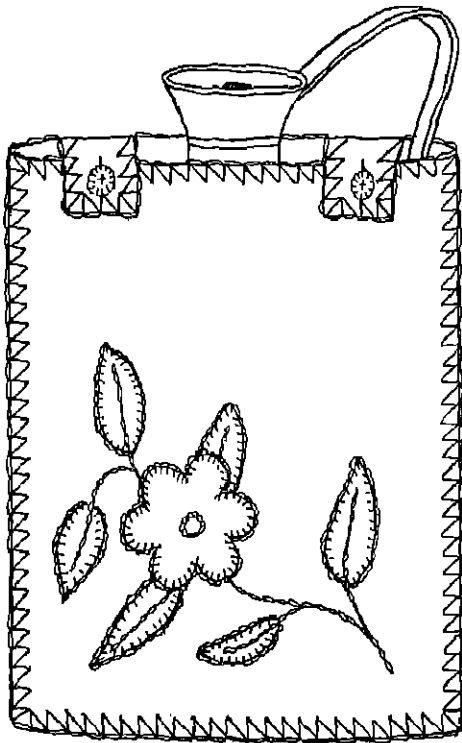


FIG. 5

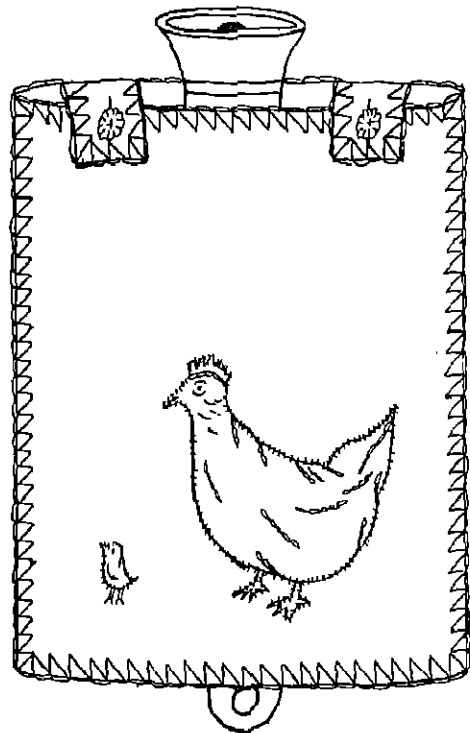


FIG. 6

stitching round the edges. Sew on the buttons by means of a cross worked in wool, Fig. 5.

8. If the *motif* is in the form of an animal, work lines of stitching or very small chain stitches to denote the neck and leg curves, etc. and a french knot for the eye as in Fig. 6.

TOILET CASE

Teacher's requirements.—A piece of hessian; coloured wools; needle; scissors; thimble; pencil; drafting paper; piece of coloured material to represent the rubber lining; sketches on the blackboard showing the working of cable stitch; completed Toilet Case.

Children's requirements.—A piece of felt cloth or linen; piece of rubber-faced cloth for a detachable lining; embroidery wools or silks; needle; thimble; scissors; pencil; ruler; drafting paper; pins; sewing cotton.

The pattern.—Draw and cut out in paper two oblongs, one 15 in. by 8 in., and the other 11½ in. by 7¾ in.

Cutting out.—Lay the large oblong on the material and the small oblong on the rubber-faced lining and cut out, allowing ½ in. turnings all round on the material and ¼ in. turnings on the lining.

Making up.

1. Fold over the long sides of the rubber-faced lining ¼ in. and press flat, folding the rubber side on to the material side.

2. Fold over this lining widthways to form a pocket 4¾ in. deep, having the turnings outside and the rubber side inside the pocket.

3. Join the sides with sewing stitches worked in ordinary sewing cotton, Fig. 1.

4. Cut off the turnings of the remainder of the lining, so that a lid is formed which will fold over the waterproof pocket.

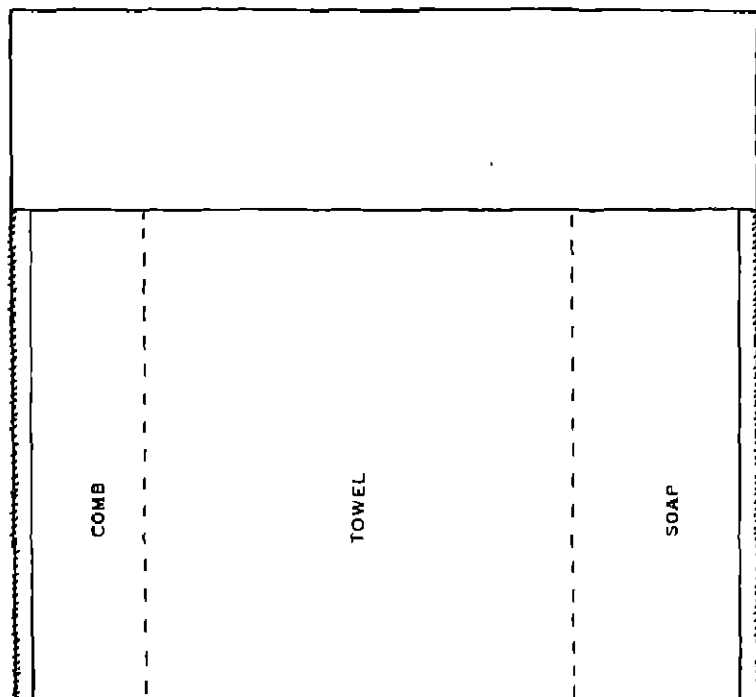


FIG. 1

5. Divide the pocket into three portions— $1\frac{1}{4}$ in., $4\frac{1}{2}$ in., and 2 in.,—joining the two sides of the pocket together with small running stitches along each division. These sections will hold a small comb, a small towel, and a small piece of soap respectively. Slip the lining in the case. This detachable lining is useful for removing to dry after use.

6. Turn a hem along the four sides on the right side of the material and hold it

widthways to form a pocket 5 in. deep and join the sides with decorative blanket stitch, Fig. 3, continuing with the same stitch along the top of the pocket and round the edges of the lid, Fig. 4.

8. In each corner of the lid work a group of flowers connected with a double row of cable stitch, Fig. 5.

9. Outline the flowers in chain stitch; fill the centres with running stitches surrounded by a ring of double couching, Fig. 5.

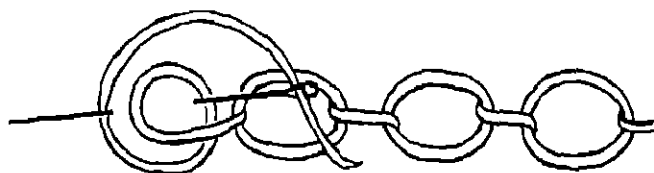


FIG. 2

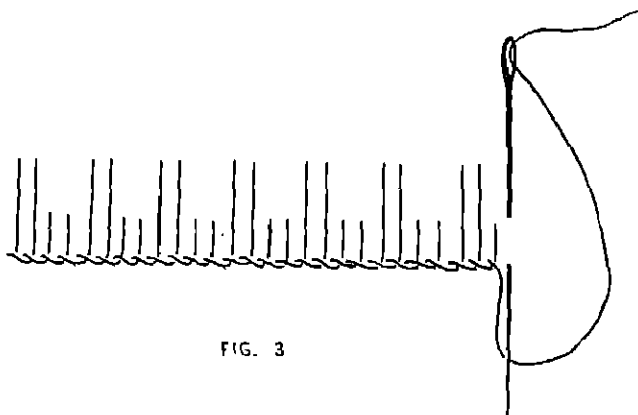


FIG. 3

in position with cable stitch, worked as follows:—

Bring the needle up through the material, throw the wool round to the left and hold it down with the thumb. Pass the needle under the held thread from left to right to form a small loop. Insert the needle in this loop and bring it out $\frac{1}{4}$ in. below and outside the loop. Tighten this loop, then pass the thread under the point of the needle to the left again. Hold with the thumb the stitch being made and draw through, Fig. 2.

7. Fold over one-third of the material

10. Make a loop in the centre or at each corner of the lid and stitch buttons opposite to the loops on the upper side of the pocket.

BOOK CARRIER

Teacher's requirements.—A piece of hessian or crash; coloured wools; needle; scissors; thimble; blackboard or chart showing illustrations of suitable decorative stitchery, etc.; drafting paper; pencil; ruler; completed Book Carrier.

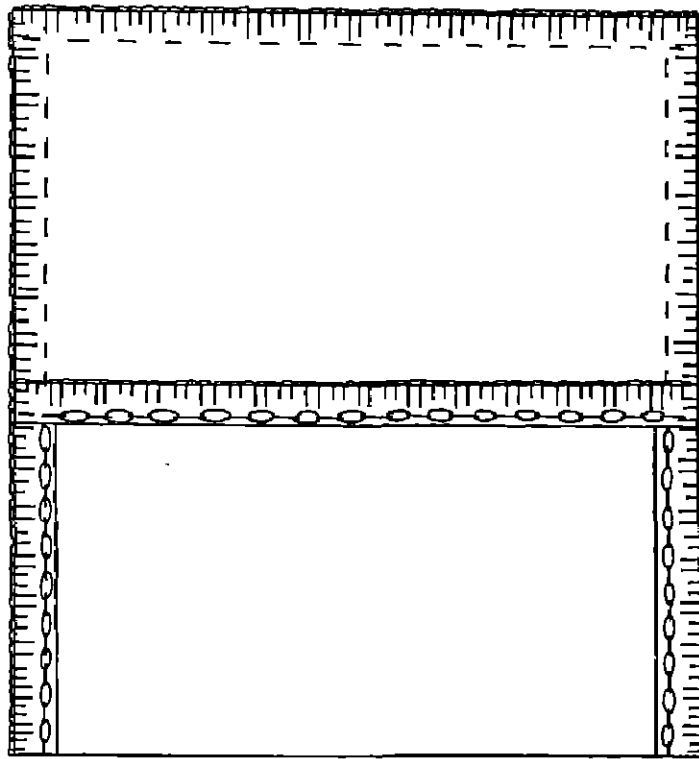


FIG. 4

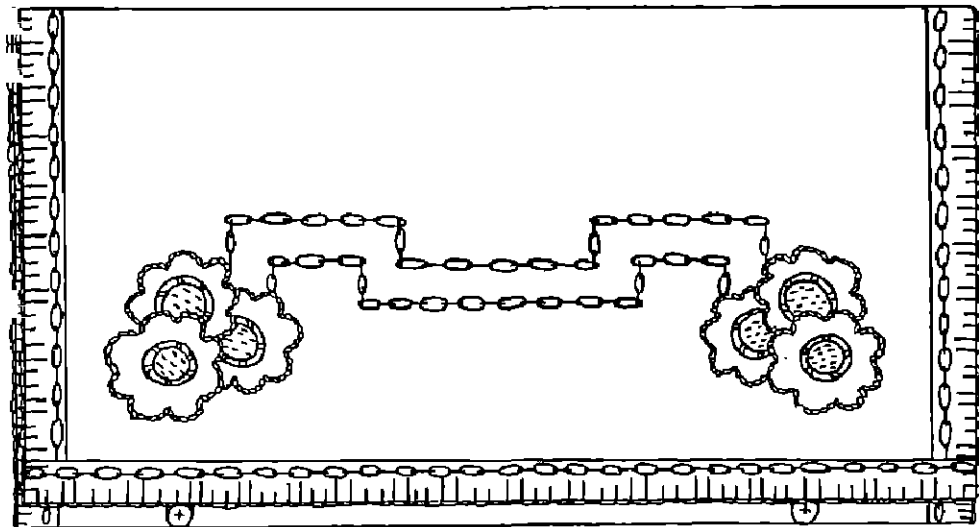


FIG. 5

Children's requirements.—A piece of holland or crash; coloured embroidery wools; needle; scissors; thimble; drafting paper; pencil; ruler.

The pattern.—Draw and cut out in paper three oblongs, one 13 in. by $8\frac{1}{2}$ in., a second $2\frac{1}{2}$ in. by $8\frac{1}{2}$ in., and a third 10 in. by 1 in.

Cutting out.—

1. Lay the large pattern on the material and cut out, allowing $\frac{1}{2}$ in. turnings on all edges.

2. Using the second pattern cut out two inside flaps allowing $\frac{1}{2}$ in. turnings all round.

3. Cut out two handles from the third pattern allowing $\frac{1}{2}$ in. turnings on the long sides only.

Making up.—

1. Turn a hem on the right side of the material all round the cover, and tack. Turn a hem on all edges of the flaps and tack. Turn a hem along the long sides only of the two handles.

2. Work ladder stitch in one colour of wool over a strand of another colour of wool on all the hems, Fig. 1. Ladder stitch, which is also known as open chain, is worked between two parallel straight lines about $\frac{1}{4}$ in. apart. The needle is passed into each line alternately, working into the loop of the previous stitch, Fig. 1. A pretty effect is obtained when this stitch is worked over one or more strands of embroidery silks or wools of a different colour.

3. Along each short side of the Carrier, measure $2\frac{1}{2}$ in. from the ends to denote the position of the handles. Arrange the handles on the wrong side as in Fig. 2, and hem the

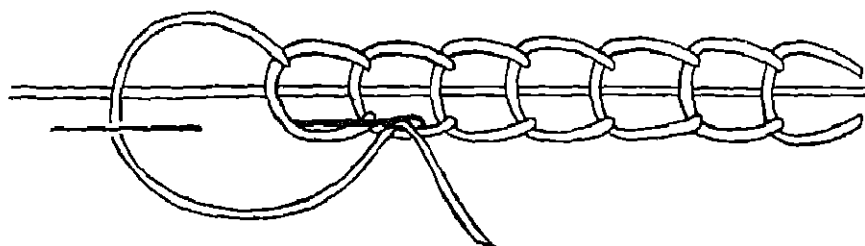


FIG. 1

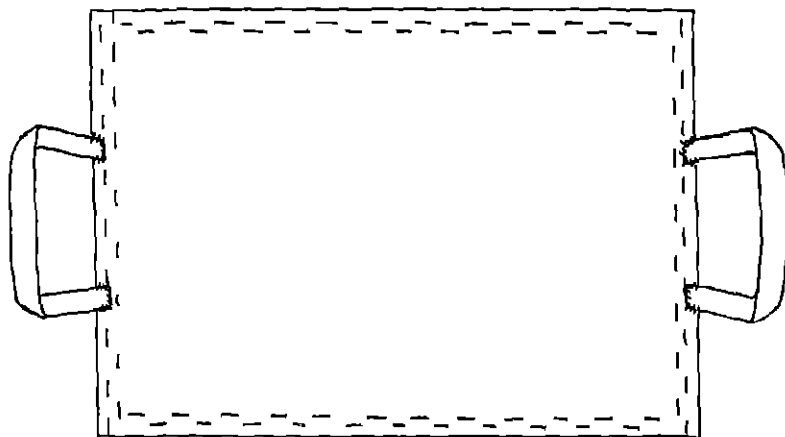


FIG. 2

ends to the under side of the hem without letting the stitches come through.

4. Place the flaps in position, wrong sides facing, and join the edges with arrow-head blanket stitch, Fig. 3. If preferred, the same decoration may be carried out on all the edges of the Carrier, Fig. 4.

5. On the front of the Carrier work a suitable design in decorative stitchery. That suggested in Fig. 5 is composed of two lines of running stitches falling exactly under each other, worked in one colour of wool, and the spaces are filled in with slanting running stitches worked in another colour of wool. The same combination of colours and stitches is carried out in the diamond-shaped centre-piece, the centre of all being

filled in with tacking stitches in alternating colours.

The Book Carrier may be made to serve a double purpose by the addition of a pocket on the back of the carrier, Fig. 6. The side edges of this pocket must lie under the hems of the Carrier, and the bottom edge may be machined to the Carrier or attached by means of the arrow-head blanket stitch. This pocket serves the useful purpose of holding stationery or newspapers.

A cover for the *Radio Times* or *Telephone Directory* may be made in the same way, to the required measurements, but omitting the handles. In these cases, a cardboard foundation must be made first and the cover made to fit it.

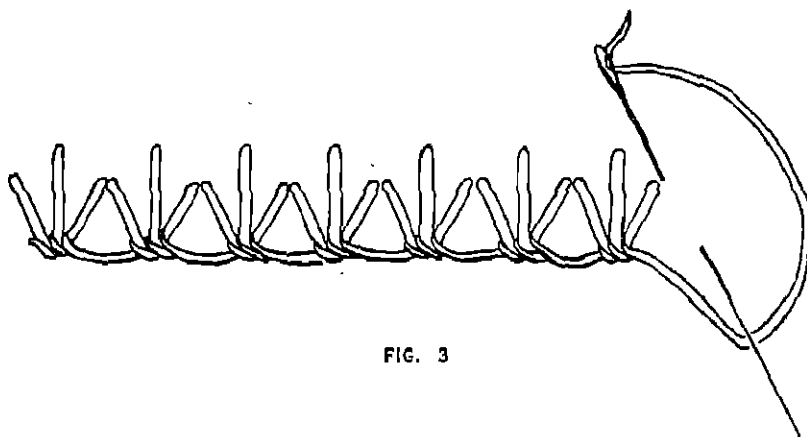


FIG. 3

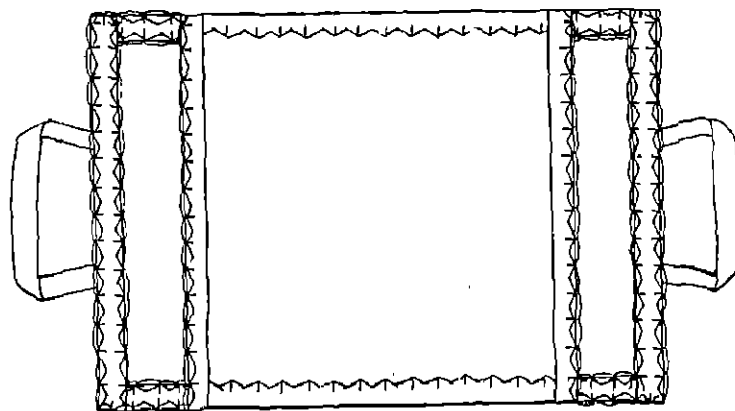


FIG. 4

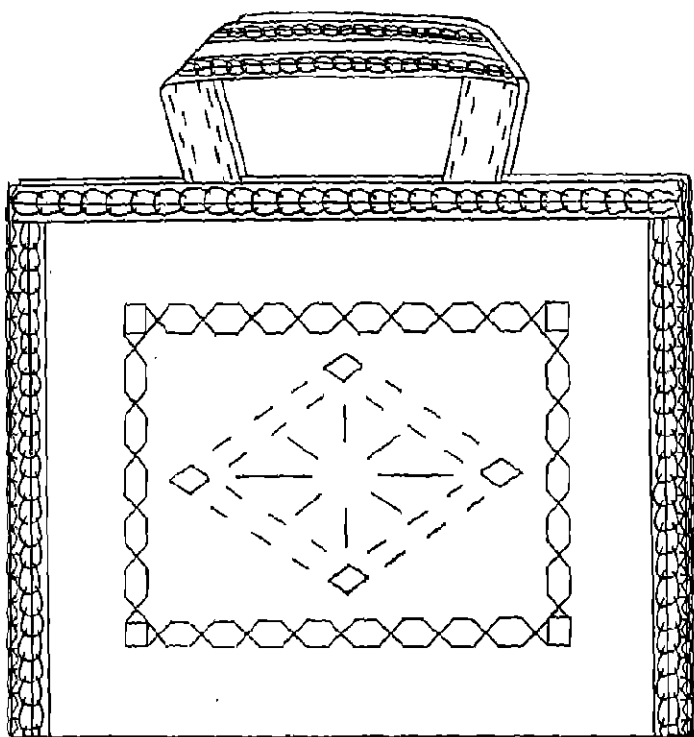


FIG. 5

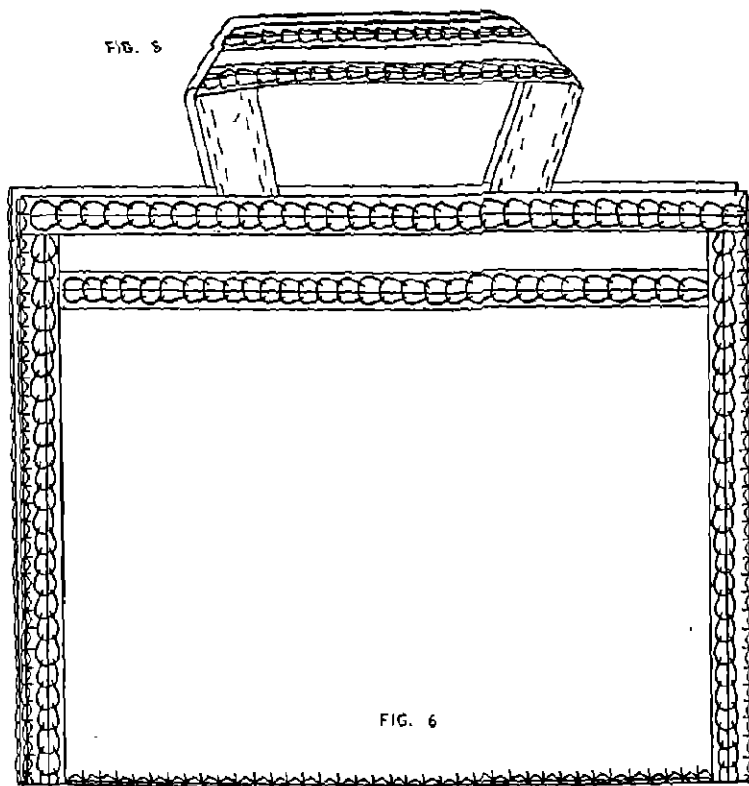


FIG. 6

PEG BAG

Teacher's requirements.—Two pieces of hessian; coloured wools; needle; pins; thimble; scissors; drafting paper; pencil; ruler; blackboard with illustrations of decorative stitchery; completed Peg Bag.

Children's requirements.—Two pieces of hessian or coarse crash; coloured embroidery cottons or wools; needle; thimble; scissors; drafting paper; pencil; ruler; coat hanger; pins.

The pattern.—Draw and cut out in paper an oblong 18 in. by 15 in. Measure from the top edge down each side $3\frac{1}{2}$ in. Join these two points with a curved line passing through the centre of the top edge.

Cutting out.—Place the bottom straight edge of the pattern to the fold of the material and cut out the bag allowing $\frac{1}{2}$ in. turnings on the side and top edges.

Making up.

1. Open out the material. Turn a hem on the sides and top edges and hold them in position with fancy ladder stitch or double chain stitch. The double chain stitch is another variation of the simple chain, and is worked in the following manner:—

Begin by making an open chain loop and into this another open chain loop placed to the left of the first, Fig. 1A. Insert the needle into the first chain loop and bring it out a little below, Fig. 1B. Repeat this

process, working alternately to the left and right sides, forming the border pattern as shown in Fig. 1C.

2. From the centre of one curved edge on the right side measure 4 or 5 in. down and on each side of this point measure 4 in. Join these last two points with a horizontal line.

3. Cut along this line and work the edges in close blanket stitches or buttonhole stitches, thus forming a large buttonhole.

4. Under this buttonhole trace the words "Peg Bag" as in Fig. 2. Outline the letters in stitching or chain stitch and fill in with herring-boning.

5. Double the material along the fold, and join the sides and top edges together

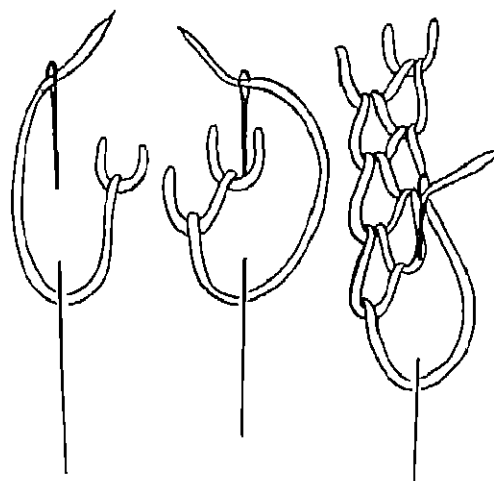


FIG. 1 A

FIG. 1 B

FIG. 1 C

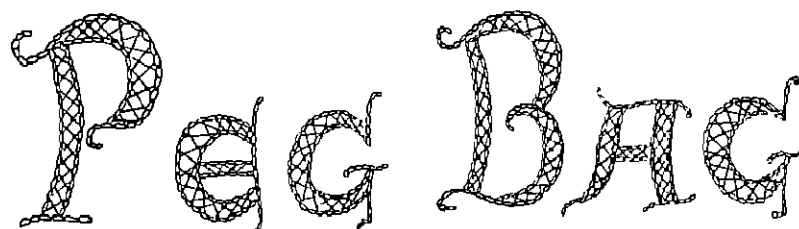


FIG. 2

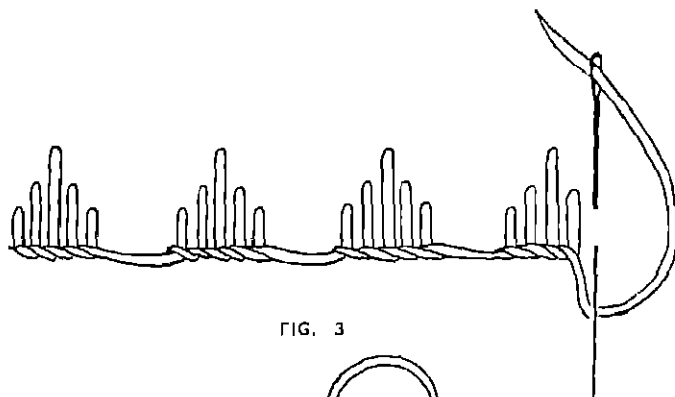


FIG. 3

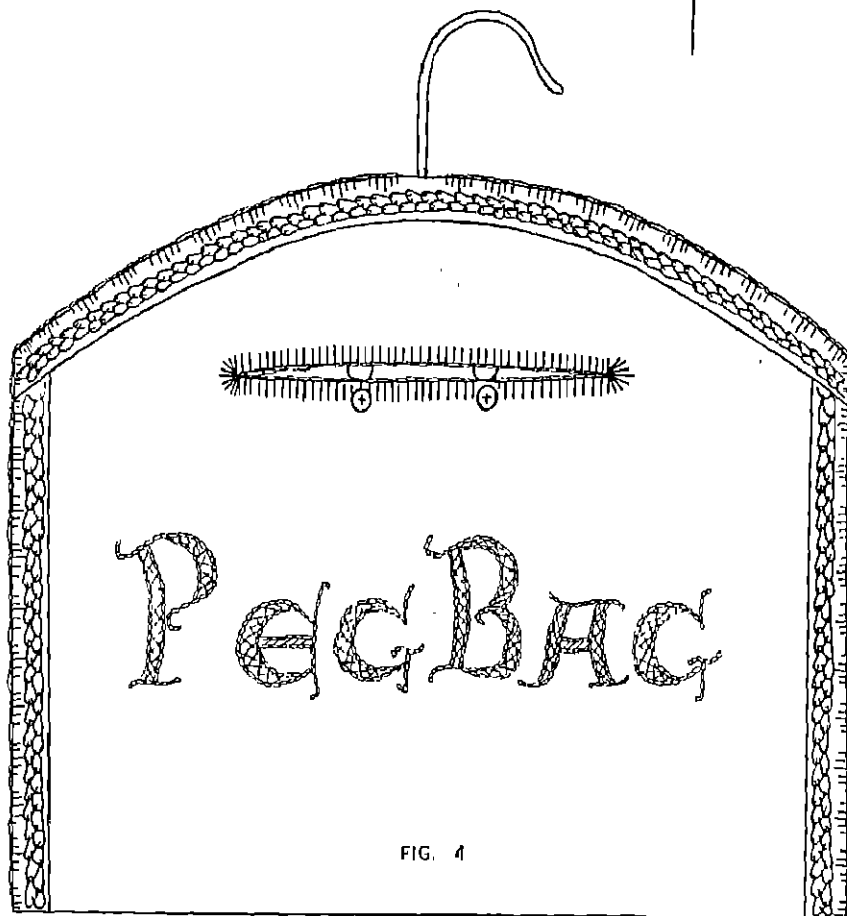
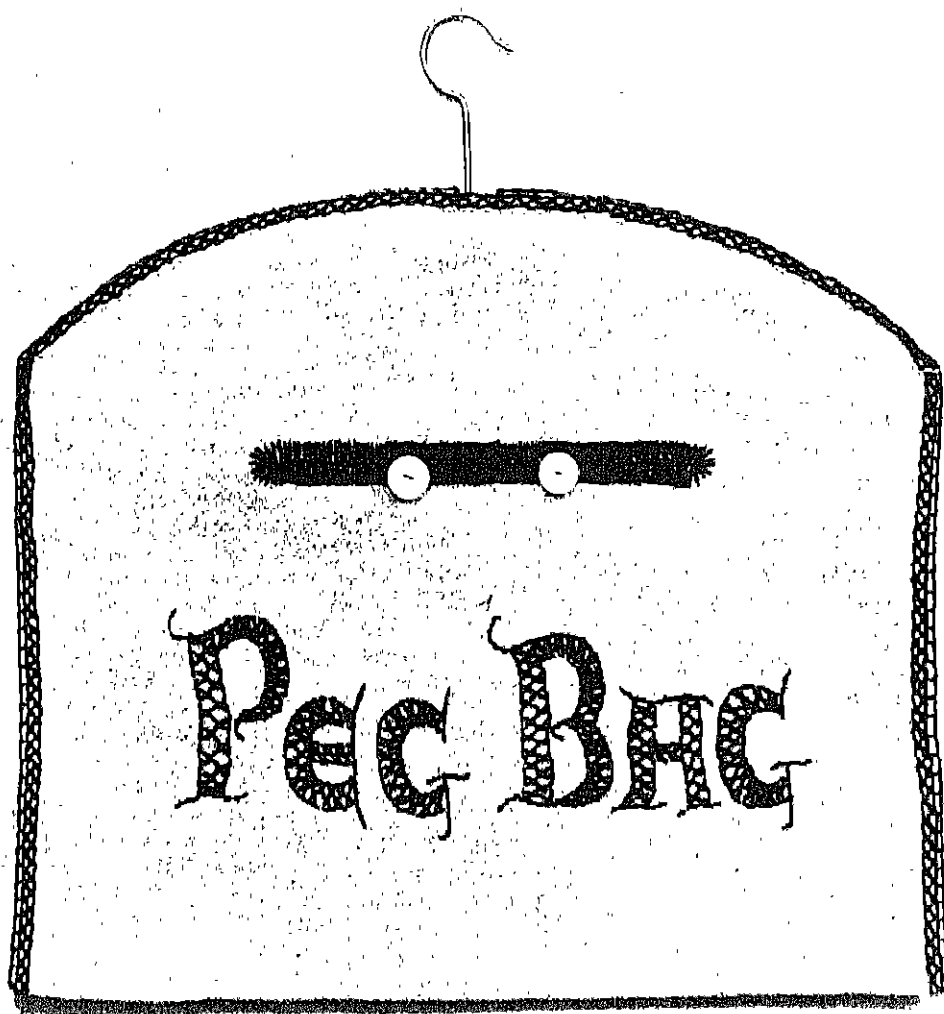


FIG. 4

with plain or spike blanket stitch, Fig. 3, leaving 1 in. unjoined in the centre of the curved edges.

6. Place a coat hanger inside and the Peg Bag is ready for sliding along the clothes line when in use.

7. Along the top edge of the buttonhole make two or three loops at even distances and on the lower edge stitch buttons to correspond, so that the hole may be closed when not in use, thus protecting the pegs from dirt, Fig. 4.



PEG BAG

NEEDLE CASE

Teacher's requirements.—An oblong piece of hessian; coloured wools; needle; scissors; thimble; pieces of flannel; completed Needle Case; piece of drafting paper; ruler; coloured pencil; pins; sketches on the blackboard or a chart illustrating the various stages of the work and the decorative stitchery.

Children's requirements.—An oblong piece of felt cloth; coloured embroidery wools or silks; needle; thimble; scissors; pins; piece of drafting paper; pieces of flannel; sewing cotton; pencil; ruler.

The pattern.—Draw and cut out in drafting paper an oblong 12 in. by 3 in. for the Case; for the flannel to hold the needles, draw and cut out two squares, one $2\frac{1}{2}$ in. and the other 2 in.

Cutting out.—

1. Lay the pattern for the case on the felt cloth and cut out, allowing $\frac{1}{2}$ in. turnings all round.

2. Lay the two remaining patterns on the small pieces of flannel and cut out without allowing turnings.

Making up.—

1. Turn a hem on all the sides of the oblong on the right side of the material (one fold only), and tack in position.

2. Along the hems work interlaced tied stitch. This is a simple but most effective border stitch. As it needs regularity of working, it is as well to mark guiding lines lightly on the material in tailor's chalk. Draw the construction lines as shown in Fig. 1. Working from left to right make a loop stitch as in Fig. 1, afterwards making a short vertical stitch to tie the loop. When

completing the "tie" stitch, the needle is brought out at the same point as the one where it was inserted when making the loop ready for working the next stitch. When the hems have been worked with tied stitch using another colour of wool, twist the needle round each stitch twice passing the wool through the short tied stitch, Fig. 2. Remove the tacking stitches.

3. To form the pocket, which is useful for holding a thimble, a small pair of scissors, a reel of cotton, and a ball of darning wool divide the oblong into four equal parts and mark with pins.

4. Turn one short side over on the wrong side to lie just below the second pin marking.

5. Tack together the side edges, afterwards working a crossed loop stitch in wool or silk, Fig. 3, along the edges and the top edge of the pocket.

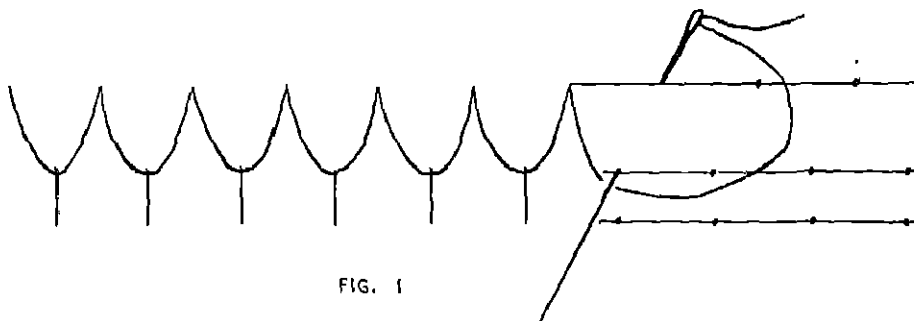
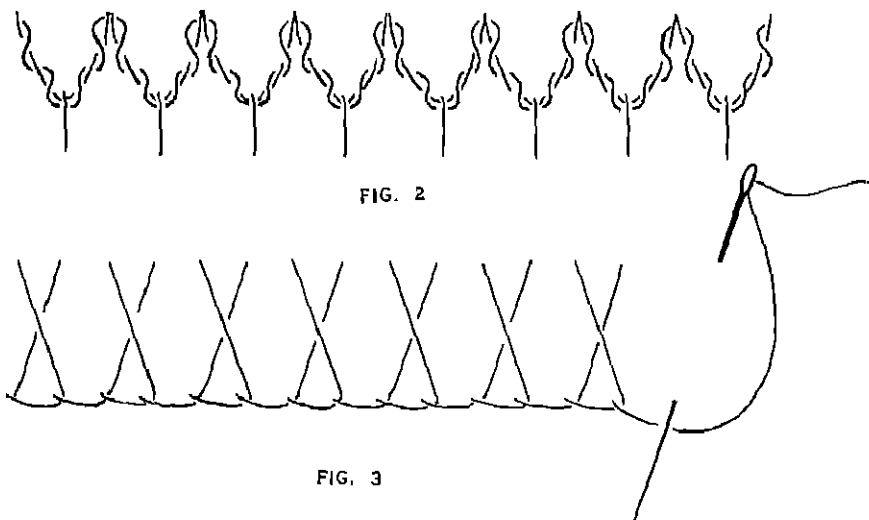


FIG. 2



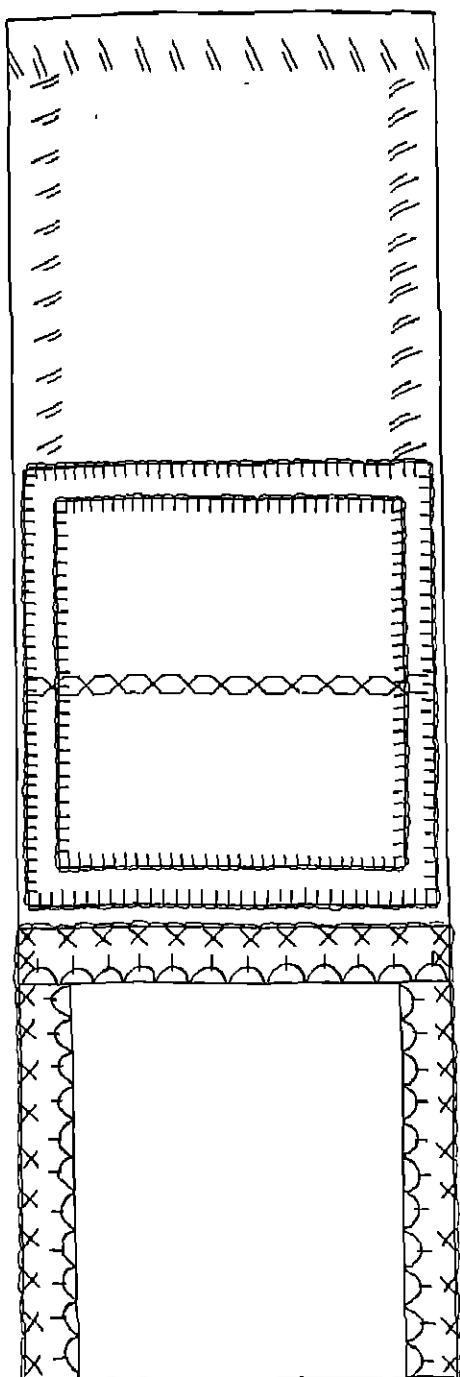


FIG. 4

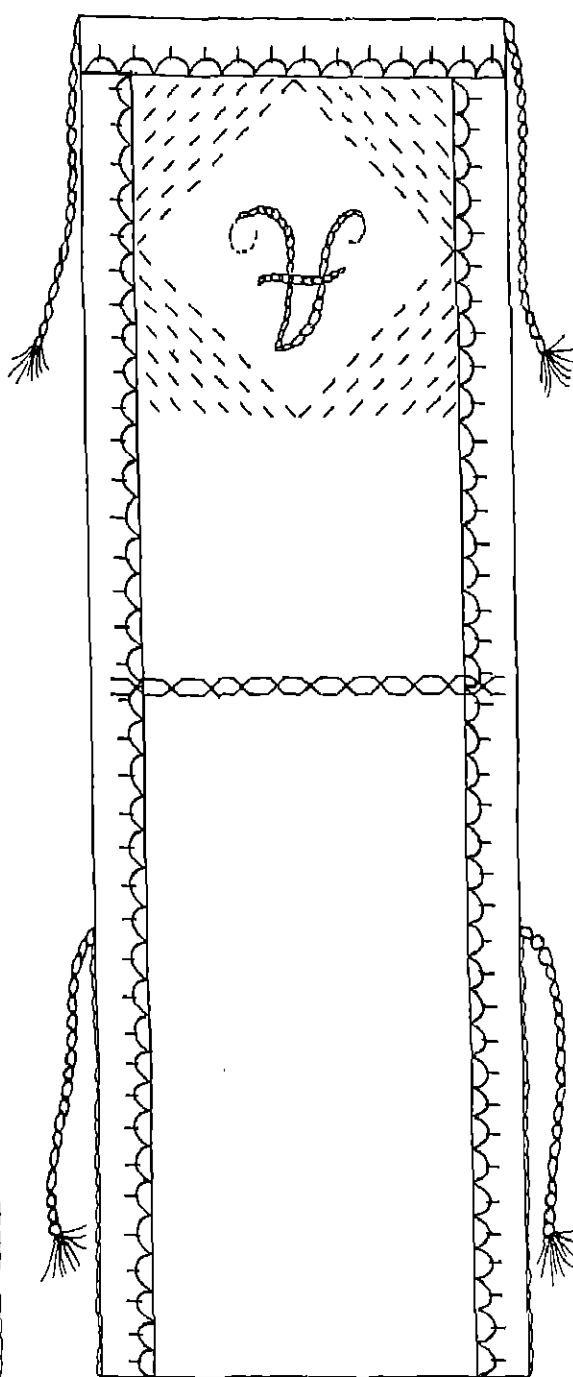


FIG. 5

6. Gimp the edges of each piece of flannel or work loop stitches all round the edges.

7. Fold each piece and crease the centre line.

8. Place the small piece over the large piece, and lay the centre line of both pieces over the centre line of the case between the second and third pin markings, on the inside of the Case. Tack in position.

9. Work two rows of tacking stitches in coloured wool about $\frac{1}{4}$ in. apart. Fill in the spaces with crossed tacking stitches of another colour, Fig. 4. Remove the tacking stitches.

10. Divide each side of the remaining quarter of the Needle Case into halves, and mark with pins.

11. Join these points with a lightly drawn pencil line to form a diamond-shaped pattern.

12. In each triangular corner thus formed, work darning stitch; in the centre diamond-shaped portion, work an initial in fine chain stitching or padded satin stitch, Fig. 5.

13. Make four lengths of cord, each about 7 in. long, of twisted embroidery wools. Attach a cord at each end of the top edge of the pocket and one at each end of the case near the darned portion, Fig. 5.

14. Fold the Case in three with the pocket inside and tie with the cord tielets, Fig. 6.

If desired, the Needle Case may be made from remnants of taffeta or artificial silk and worked in embroidery silks. Before presenting the gift, place the necessary requisites in the pocket, and needles and pins of various kinds in the pieces of flannel.

HANDKERCHIEF SATCHETS

Teacher's requirements.—A piece of hessian or crash; coloured wools; needle; scissors; thimble; pencil; ruler; drafting paper; black-board showing illustrations of the decorative stitchery; piece of coloured material for lining; wadding; completed Satchel in both styles.

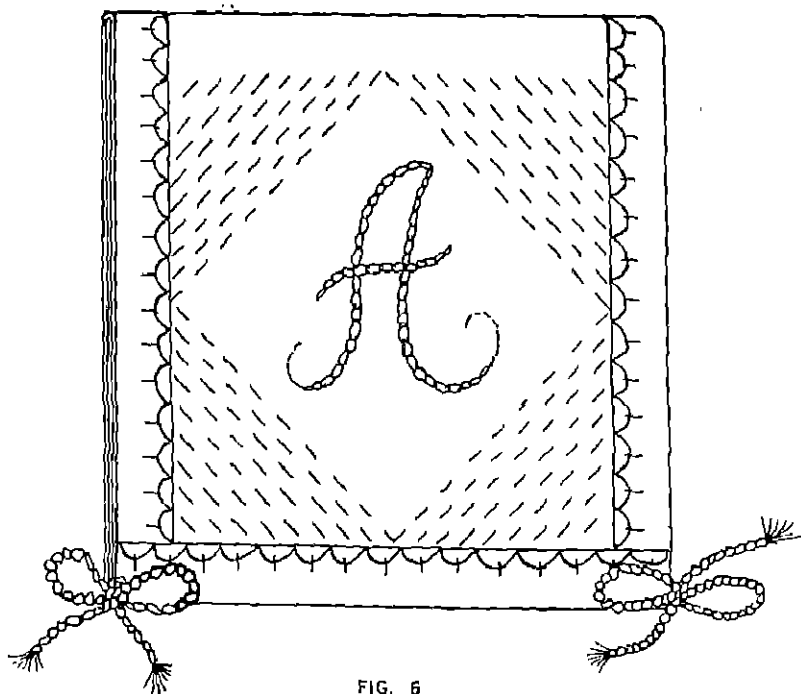


FIG. 6

Children's requirements.—A piece of pastel-coloured linen, satin or taffeta silk; embroidery silks; piece of material suitable for lining; e.g., Jap silk; needle; scissors; thimble; pencil; ruler; drafting paper; pins.

AN OBLONG SACHET

The pattern.—Draw and cut out in paper an oblong 13 in. by 8 in.

Cutting out.—

1. Lay the pattern on the material and lining and cut out, allowing $\frac{1}{2}$ in. turnings on the material and $\frac{1}{4}$ in. turnings on the lining.

2. Lay the pattern on the wadding and cut out on the pattern lines.

Making up.—

1. On the right side of the material measure $1\frac{1}{2}$ in. from the outside edges, and mark a line lightly in tailor's chalk.

2. To the inside of this line draw lightly another line 1 in. away from the first line.

3. Work along these lines a border of single or double herring-bone and daisy stitches, using different coloured silks, Fig. 1.

4. Between the two borders work star stitches at intervals of 1 in., placing an extra star in each corner, Fig. 3. Star stitch is worked as in Fig. 2, each stitch starting from the centre.

5. In the centre along a short side within the last line of the border, work a group of four stars, Fig. 3. This forms the top of the Satchet.

6. Lay the wadding on the wrong side of the material, turn over the $\frac{1}{2}$ in. turnings and catch-stitch them down to the wadding with ordinary sewing cotton, Fig. 4.

7. Tack down the turnings of the lining on the wrong side, lay it over the wadding and slip-stitch the edges together, Fig. 4.

8. With the embroidery silks, make a cord 72 in. long, tie a knot at each end and fringe the ends.

9. Leaving about 8 in. at the end to form a tie, sew the cord along the edge of the Satchet, beginning in the centre of the short

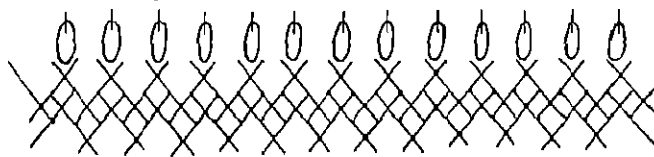


FIG. 1

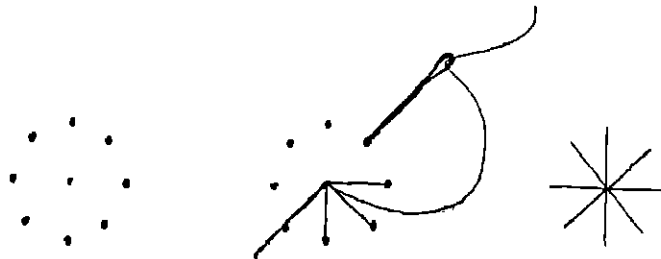


FIG. 2

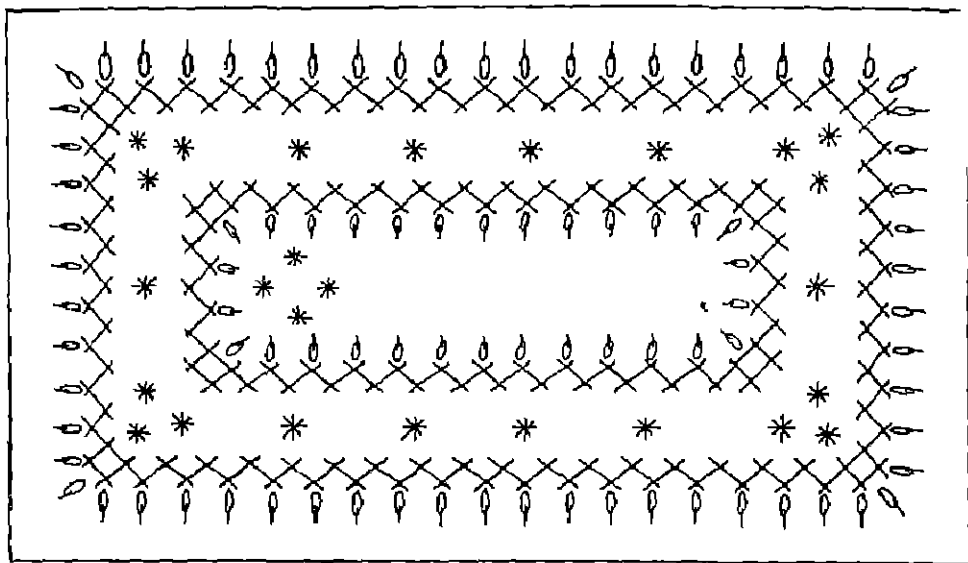


FIG. 3

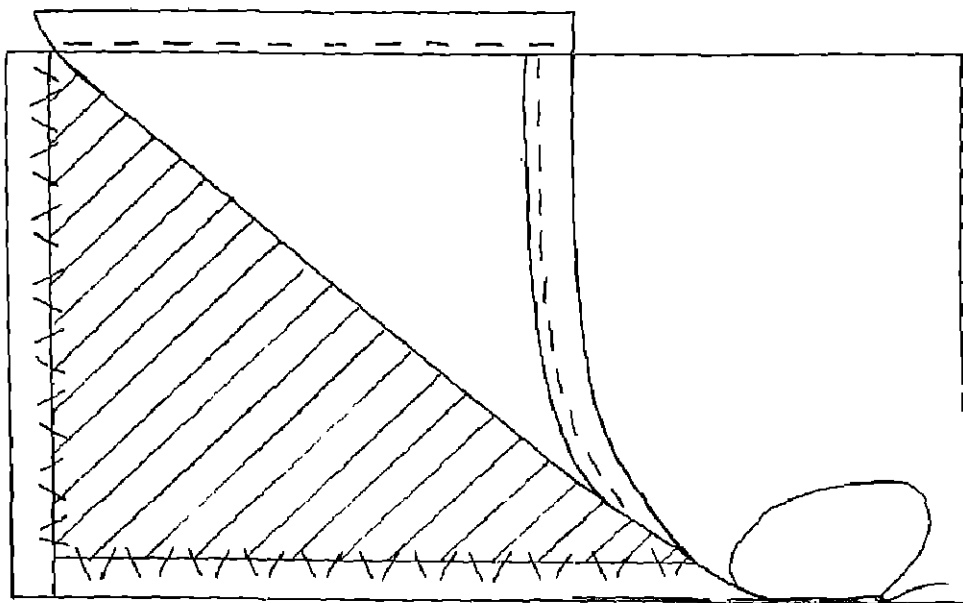


FIG. 4

side which forms the bottom of the Satchel, and form a double loop each $1\frac{1}{2}$ in. long at each corner, and a single loop in the centre of the top short side.

10. Fasten the Satchel by means of a bow tied with the ends through the centre loop, Fig. 5.

A CIRCULAR SATCHET

The pattern.—Draw and cut out in paper a circle with a diameter 8 in. long.

Cutting out.—

1. Cut out two circles of material and lining, allowing $\frac{1}{2}$ in. turnings on the material and $\frac{1}{4}$ in. turnings on the lining.

2. Cut out two circles in wadding exactly like the pattern.

Making up.—

1. On the right side of one material piece, mark lightly a concentric circle $1\frac{1}{2}$ in. away from the circumference.

2. At even intervals on the inside of this circle mark lightly in tailor's chalk eight circles with a halfpenny, having the circumference of each small circle touching the circumference of the large circle, Fig. 1.

3. Fill in each alternate circle with blanket stitches radiating from a small circle in the centre. Pretty effects may be obtained by using various colours of embroidery threads, Fig. 1.

4. Fill in the remaining circles with daisy stitches and work a French knot in the centre, Fig. 1.

5. Join the flowers with a line of catch stitches interspaced with tacking stitches, Fig. 1.

6. Place a line of small running stitches $\frac{1}{4}$ in. away from the circumference in ordinary

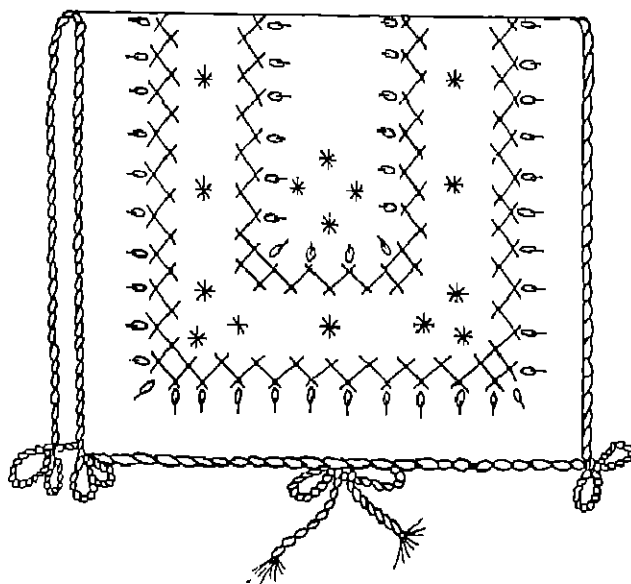


FIG. 5

sewing cotton. Lay the wadding to the wrong side of the material, fold over the turnings, drawing up the running thread to make them lie flat, and catch-stitch the material to the wadding, Fig. 2.

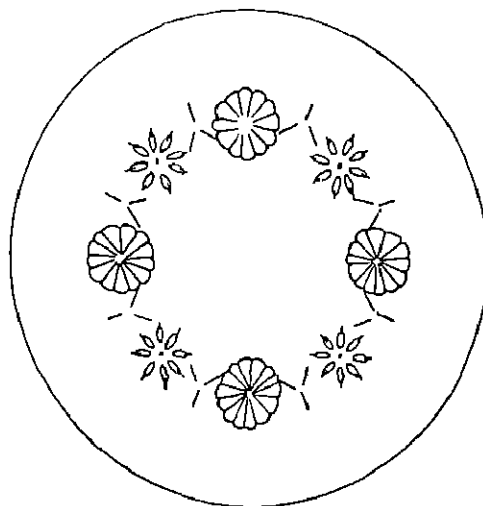


FIG. 1

7. Line in the same way as for the oblong Satchel.

8. Repeat the process with the remaining circles of material, etc., without embroidering a design unless desired.

9. Lay the two portions together with the linings inside and tack the edges together.

10. Using embroidery silks, sew these edges together all round the circle except for a section, the ends of which are determined by drawing a straight line across the circle 2 in. from the circumference, Fig. 3. The open portions are sewn separately in the same way.

11. Work another line of sewing stitches over these in the opposite direction, Fig. 3.

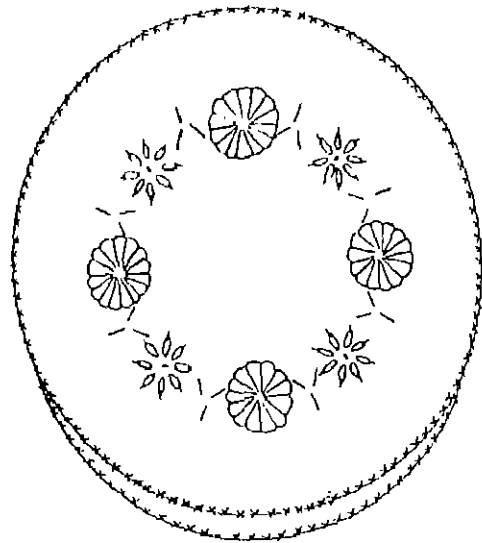


FIG. 3

TEA-COSY COVERS

Teacher's requirements.—Two pieces of hessian; coloured wools; needle; scissors; thimble; pins; drafting paper; coloured pencil; ruler; blackboard showing illustrations of suitable decorative stitchery, etc.; completed Tea-cosy Covers.

Children's requirements.—Two pieces of natural or pastel-shaded linen; embroidery silks; pins; needle; thimble; scissors; drafting paper; pencil; ruler.

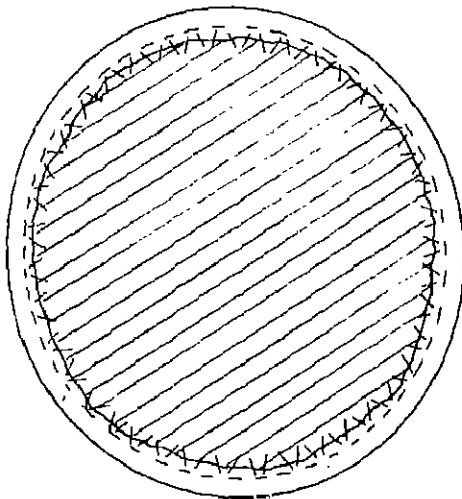


FIG. 2

A RECTANGULAR-SHAPED TEA-COSY COVER

The pattern.—

1. Draw an oblong ABCD, $AB = 7\frac{1}{2}$ in. and $BC = 10\frac{1}{2}$ in. From A measure $AE = 1$ in.

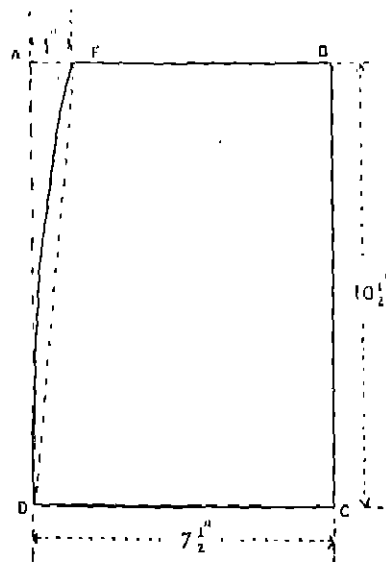


FIG. 1

2. Join ED with a curved line. Cut out on the lines passing through the points BCDEB, Fig. 1.

Cutting out.—

1. Place the pattern on the material having BC to the fold, and cut out, allowing $\frac{1}{2}$ in. turnings all round.

2. Cut a second piece similar to the first.

Making up.—

1. Turn a hem on all the edges on the right side of each piece of material; along the hems work two rows of running stitches, and in each space work a group of three tacking stitches to form an arrow head, Fig. 2.

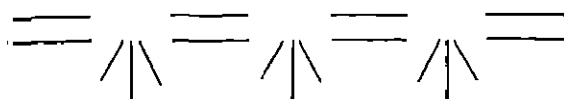


FIG. 2

2. In the two bottom corners of each piece of material work a design in the same decorative stitchery as that used in the border, Fig. 3.

3. Make a cord 6 in. in length of twisted embroidery threads.

4. Along the top edge of one piece of material measure from each corner 4 in. Place the ends of the cord to these points on the wrong side and sew down firmly, Fig. 3.

5. Place together both pieces of the cover and join the two sides and top edges together with sewing stitches, afterwards repeating the process in the reverse direction, Fig. 3.

A SEMICIRCULAR-SHAPED TEA-COSY COVER

The pattern.—

1. Draw an oblong ABCD, AB = $7\frac{1}{2}$ in.; BC = $10\frac{1}{2}$ in.

2. Along BA measure BE = $1\frac{1}{2}$ in. and along DA measure DF = $3\frac{1}{2}$ in.

3. Join EF with a curved line as in Fig. 1. AG = 3 in. measured along AC to serve as a guiding point when drawing the curved line. Cut out on the lines passing through the points BCDFGEB.

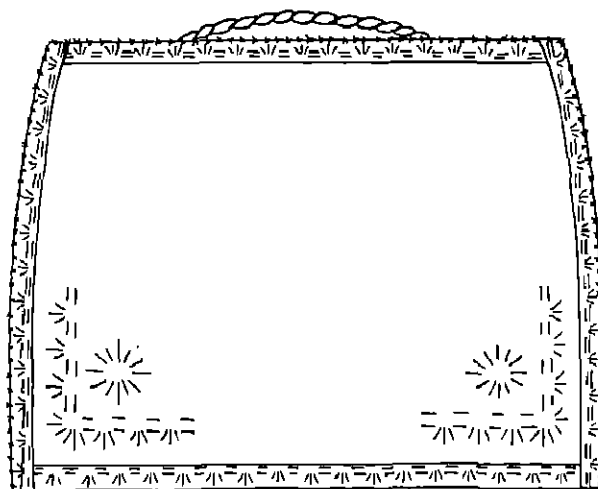


FIG. 3

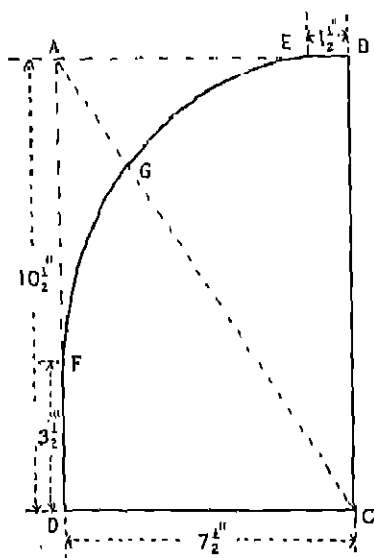


FIG. 1

Cutting out.—

1. Place the pattern on the material putting BC to the fold and cut out, allowing $\frac{1}{2}$ in. turnings all round.
2. Cut out a second piece similar to the first.

Making up.—

1. On the right side of each piece of material turn a hem on all the edges.

2. Along the hems work a row of catch stitches, and in each small space work an arrow head of three tacking stitches, Fig. 2.

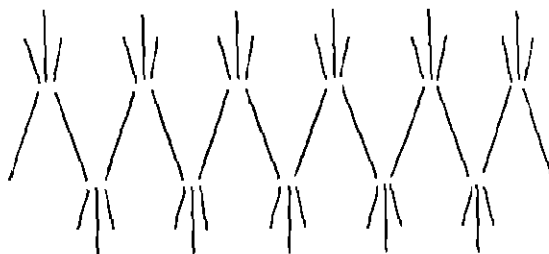


FIG. 2

3. In the centre of each piece of material work a design as suggested in Fig. 3, using the same stitches as for the border.

4. Place together the wrong sides of both portions of the cover and join the sides and curved edges with alternating long and short blanket stitches, Fig. 3.

If preferred the hems may be turned on the wrong side and held in position with a decorative border worked on the right side, and the centre may be decorated with a floral design.

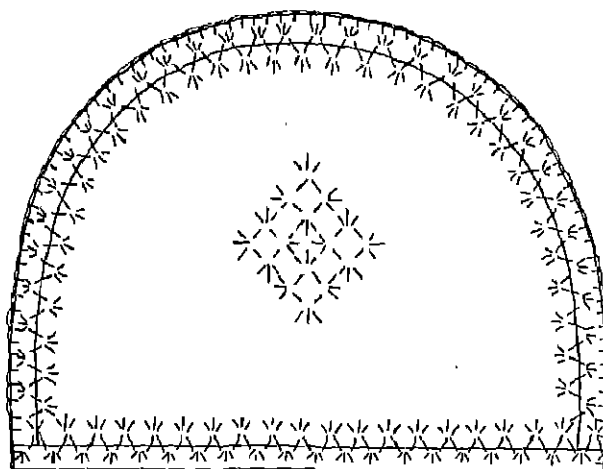
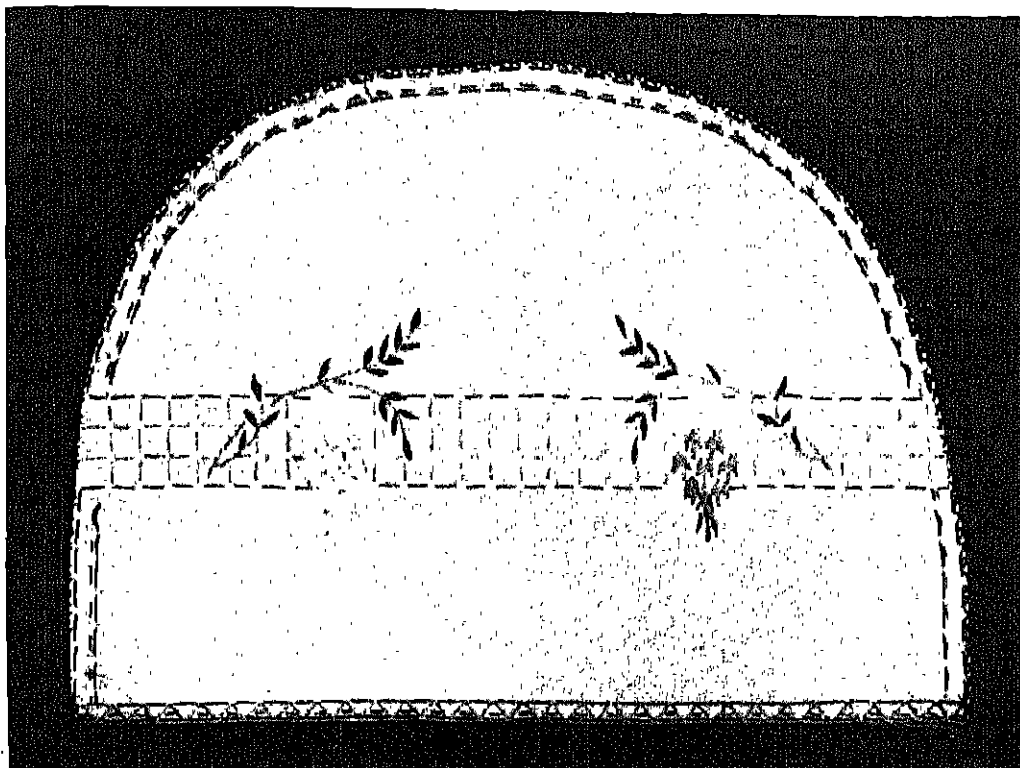


FIG. 3



TEA-COSY COVER

PARROT-SHAPED TEAPOT HOLDER

Teacher's requirements.—A large piece of hessian; similar piece of coloured material to represent the flannel lining; enlarged pattern; pattern drafted to the required size; completed Teapot Holder; piece of cardboard; pad of cotton wool; coloured wools; needle; pins; thimble; ruler; scissors; coloured chalks; chart showing sketches of the various stages in the making of the Teapot Holder; blackboard showing the draft of the pattern; a sheet of drafting paper; blackboard; coloured pencils.

Children's requirements.—A sheet of drafting paper; piece of artificial silk; similar piece of flannel; embroidery cottons or silks; needle; pencil; ruler; pins; scissors; thimble; piece of cardboard; pad of cotton wool; sewing cotton; piece of chalk.

The pattern.—

1. Draw an oblong ABCD, $AB = 3$ in.; $BC = 8\frac{1}{4}$ in. Draw the pattern as in Fig. 1. $E = 1$ in. out and 1 in. down from A; $F = \frac{1}{2}$ AD; $G = 1$ in. out and 1 in. up from D; $H = 1$ in. out from B. Cut out.

2. Draw an oblong PQRS. $PQ = \frac{3}{4}$ in.; $QR = 1$ in. Draw the pattern for the beak as in Fig. 2. $T = \frac{1}{2}$ PQ; $V = \frac{1}{2}$ QR; $W = \frac{1}{2}$ PS; $SX = \frac{1}{3}$ in. Cut out.

Cutting out.—

1. Fold the material widthways in half and place the pattern on the material with BC to the fold. Cut out all round the pattern allowing $\frac{3}{8}$ in. turnings.

2. Cut out a similar piece from the flannel without allowing turnings.

3. Lay the pattern for the beak on the cardboard, mark round with a pencil, and cut out.

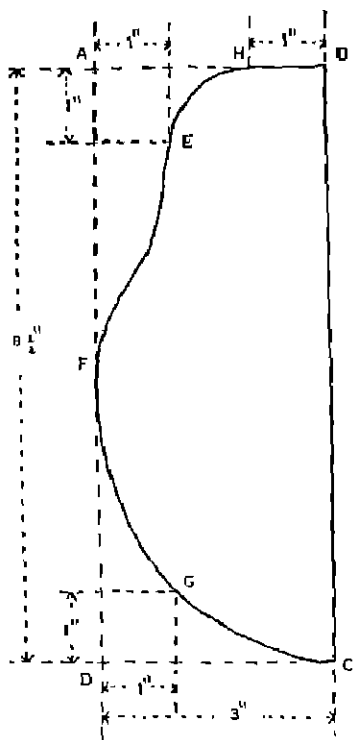


FIG. 1

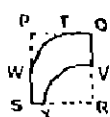


FIG. 2

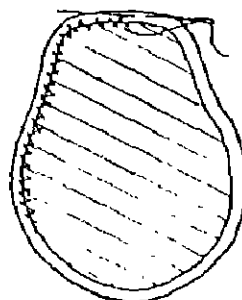


FIG. 3

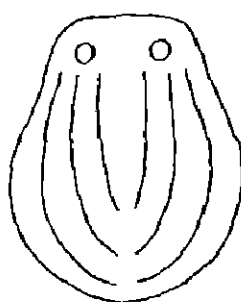


FIG. 4

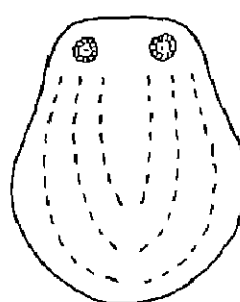


FIG 5

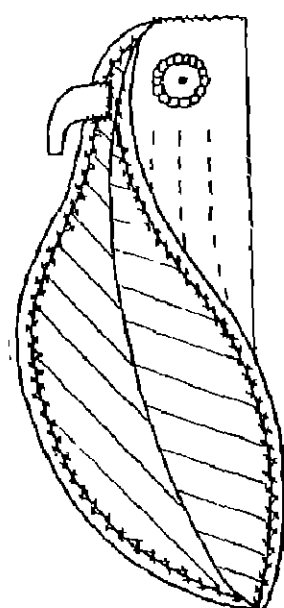


FIG. 6

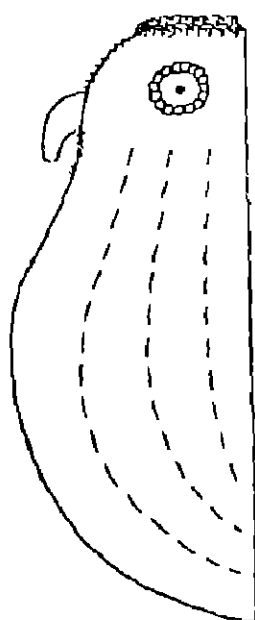


FIG. 7

PARROT-SHAPED TEAPOT HOLDER

Making up.—

1. Turn a $\frac{1}{4}$ in. fold all round the edge of the piece of silk on the wrong side of the material and tack it in position.

2. Place the piece of flannel on the silk, wrong side to wrong side, and tack the two pieces together. This will leave $\frac{1}{8}$ in. of the silk showing beyond the raw edge of the flannel.

3. Herring-bone the flannel to the material round the outside edge with embroidery silk, the upper stitch being taken through the flannel only, and the lower stitch being taken through the turnings only of the silk, Fig. 3. Interlace the herring-bone stitches with another colour of embroidery silk if desired. Remove the tacking stitches.

4. Fold the material lengthways into two equal parts, having the flannel inside.

5. On one half near the top, mark a circle in chalk, using a sixpence as a guide. This represents the eye of the parrot. From near this circle draw lines to represent the wings as in Fig. 4.

6. Fold the material inside out so that this time the flannel lies outside. Press the doubled material tightly to obtain a chalk impression of the eye and the wings on the remaining half of the Teapot Holder, Fig. 4.

7. Work a line of chain stitches in embroidery silk round the chalk rings, the stitches passing through both materials, and, slipping the needle from the chain stitches between the double material to the centre of the circle, make a French knot to represent the pupil of the eye, Fig. 5.

8. Beginning at the top of one of the outside lines, work over the chalk lines with tacking stitches in embroidery silk, making each stitch $\frac{1}{2}$ in. long and passing through the silk only. Slip the needle between the double material when passing from one line to the next. Sufficient silk must be taken in one length to work both sides of the "wings" without a join. When beginning and ending the tacking stitch, a back stitch is made through the flannel only, Fig. 5.

9. Fold the material in two, having the flannel inside, and sew the top edges together until on a level with the centre of the eye.

10. Insert the cardboard beak just where the sewing stitches end, and hem it down to the flannel on one side, Fig. 6.

11. Sew the two sides together for 1 in. below the beak.

12. Along the join at the top of the head work a row of blanket stitches and inside these stitches work another row of blanket stitches.

13. Pad the inside of the head with the cotton wool.

SCARF

Teacher's requirements.—A piece of crash; piece of material to represent lining; coloured wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler; designs suitable for scarves illustrated on the black-board or on a chart; completed Scarf; pattern.

Children's requirements.—A piece of plain woollen material, velour cloth, felt cloth or velvet; a piece of the same material or other material suitable for lining; embroidery wools; needle; thimble; scissors; pins; drafting paper; ruler; pencil.

The pattern.—Draw an oblong ABCD, AB = 5 in.; BC = 19 in. Continue the line at C and D so that DF = CE = $1\frac{1}{4}$ in. G = $\frac{1}{2}$ EF. GH = $2\frac{1}{2}$ in. (measured perpendicular to EF). Join EH and FH with straight lines afterwards joining with a curved line, curving to $\frac{1}{10}$ in. in the centre. DK = CL = $2\frac{1}{2}$ in. Join FK and EL with curved lines curving to $\frac{1}{8}$ in. in the centre, Fig. 1.

Cutting out.—

1. Place the pattern with the line AB to the fold of the material and cut out allowing $\frac{1}{4}$ in. turnings all round.

2. Cut out a similar piece for the lining.

Making up.—

1. On each pointed end on the right side of the material draw a design such as is shown in Fig. 2.

2. Work the design in coloured wools.

3. Lay the right sides of the material and the lining together, and join the edges of the two long sides and one end together with machining.

4. Turn inside out, turn inside and tack

the edges of the remaining end and slip-stitch them together, Fig. 3.

CUTLERY HOLDERS

Teacher's requirements.—A piece of hessian; piece of flannel or other suitable woollen material; coloured wools; needle; scissors; thimble; pins; suitable designs

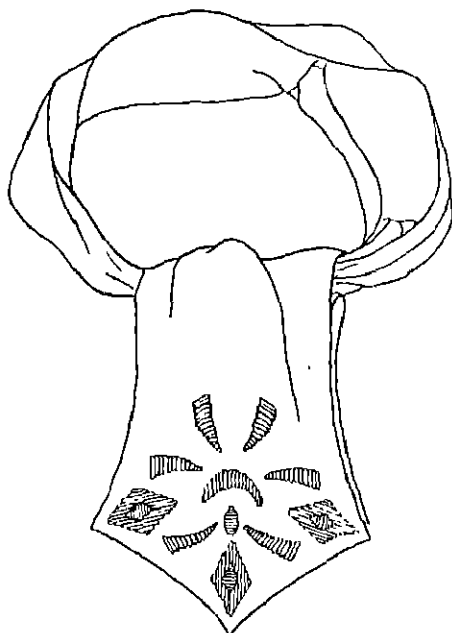
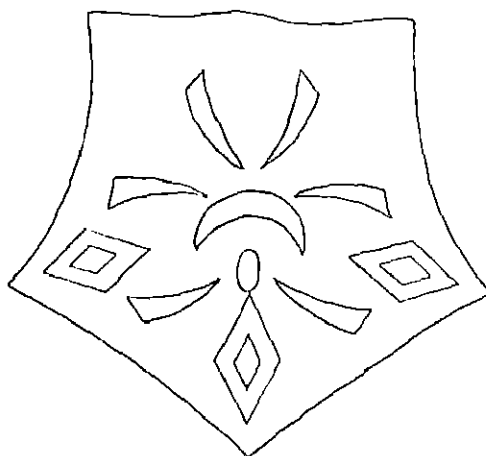
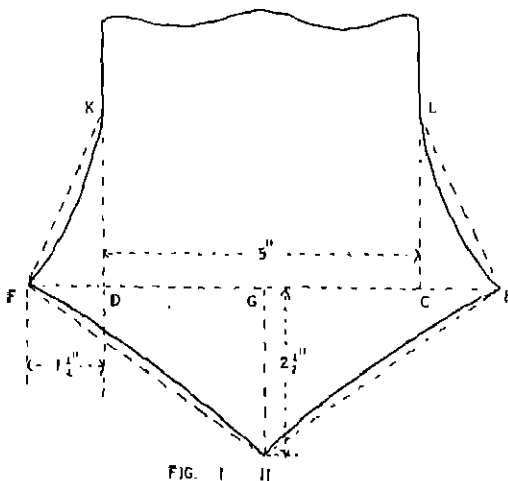


FIG. 3

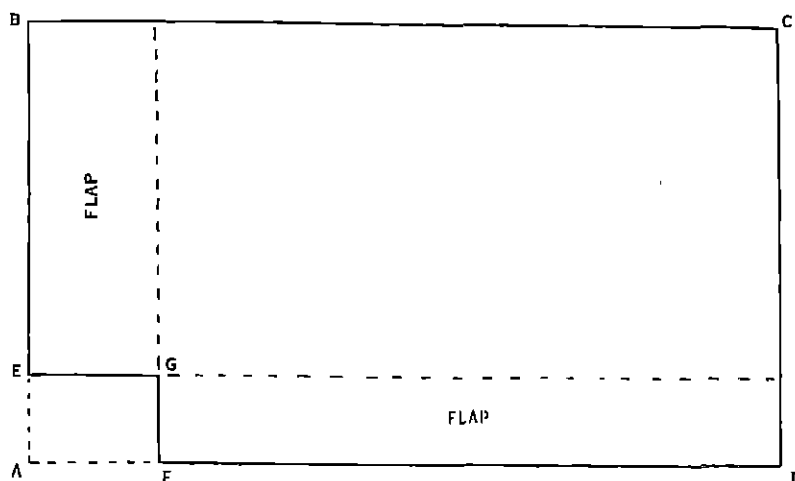


FIG. 1

illustrated on a chart or blackboard; pattern; drafting paper; pencil; ruler; completed Cutlery Holders.

Children's requirements.—A piece of linen or crash; piece of flannel; coloured embroidery silks or wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler.

The pattern.—The size depends upon the kind of cutlery and the number of knives, forks, or spoons the case may have to hold.

1. For a case to hold six dessert spoons, draw and cut out an oblong ABCD, AB = 10 in.; BC = 18 in.; AE = 2 in.; AF = 3 in.

2. Cut away the oblong AEGF, Fig. 1.

3. Draw and cut out a second oblong 8 in. by 15 in.

Cutting out.—

1. Lay the first pattern on the linen and cut out, allowing $\frac{1}{2}$ in. turnings on all edges.

2. Lay the second pattern with the 15 in. side to the fold of the flannel and cut out on the pattern lines along the long edge and allow $\frac{1}{2}$ in. turnings on the two short edges.

Making up.—

1. Machine together the two edges along each short side on the wrong side of the flannel. Turn the flannel inside out and tack along the two joined edges and the fold.

2. Divide the long edge of the flannel into six equal portions suitable for holding the pieces of cutlery—in this case $2\frac{1}{2}$ in., and tack each portion from one long edge to the other through both thicknesses of flannel.

3. Work decorative stitchery along each division; e.g., in Fig. 2 the compartments are separated with stitched chain stitch.

4. Along the open edges of the flannel work blanket stitch in wool to keep them from fraying, Fig. 2.

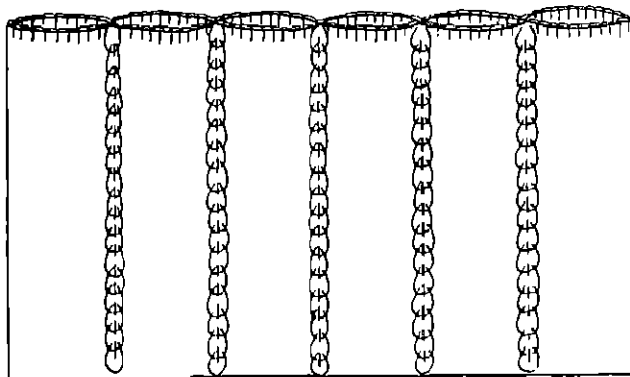


FIG. 2

5. On the right side of the piece of linen turn a small hem on all the edges. Where the section has been cut away snip the turnings diagonally to allow the hem to be turned on the two short sides, folding under each snipped edge.

6. To hold these hems in position work a decorative border as in Fig. 3. This consists

line stitch a design of the article to be enclosed; i.e., knife, fork, dessert spoon or teaspoon, Fig. 4.

8. Lay the flannel on the wrong side of the linen with one short edge and the folded edge to the edges of the linen without the flaps.

9. Join the linen and flannel together

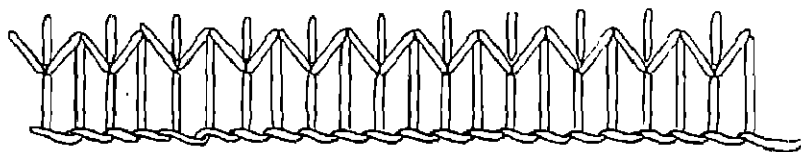


FIG. 3

of a line of alternate short and long loop stitches, with a zigzag line of tacking stitches worked in another colour of wool above, and a straight tacking stitch in yet another colour of wool tipping the short loop stitches.

7. The short side from which the portion has been cut away forms the flap for the case. On it work in stitching or any out-

with blanket stitches worked in wool. Attach the remaining corner to the linen by working a few close blanket stitches in the corner between the two flaps, Fig. 5.

10. Twist the wools together to form a cord long enough to tie round the case when it is rolled up, and stitch it in the centre of the flap, Fig. 6.

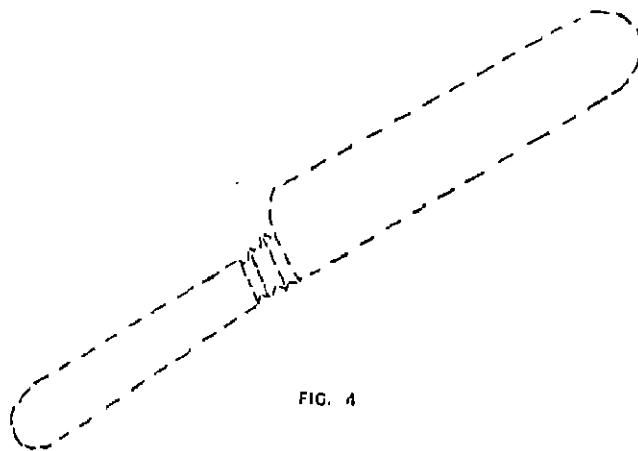


FIG. 4

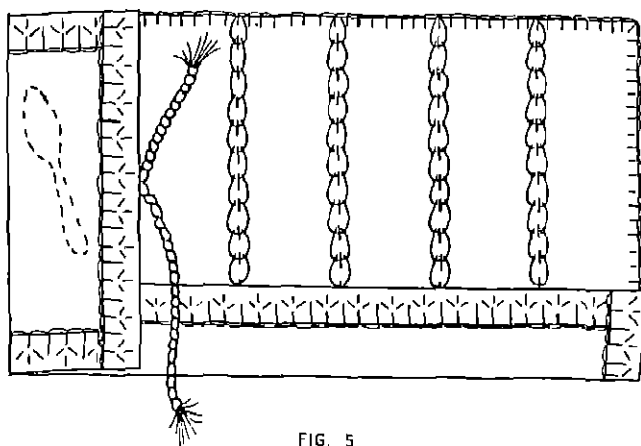


FIG. 5

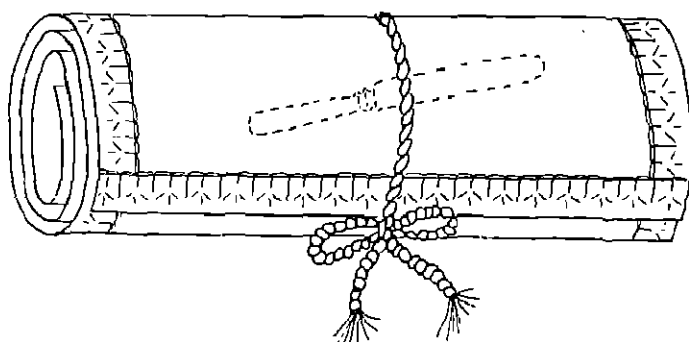


FIG. 6

11. Figs. 5 and 6 show the Holder open and closed.

SHOE-CLEANING OUTFIT

Teacher's requirements.—A piece of hessian; piece of material for lining; coloured wools; needle; scissors; thimble; pins; piece of cardboard; two button moulds; drafting paper; pencil; ruler; compass; pattern; completed Outfit; designs suitable for decorating the article shown on a chart.

Children's requirements.—A piece of felt cloth; piece of linen or linnene to tone; embroidery wools or silks; needle; scissors;

thimble; pins; a piece of cardboard; two small button moulds; compass; drafting paper; pencil; ruler.

The pattern.—Draw and cut out an oblong 10 in. by 7 in. and a circle 3 in. in diameter.

Cutting out.—

1. Lay both the patterns on the felt cloth and cut out, allowing $\frac{3}{8}$ in. turnings on all edges. Cut out two circles.

2. Lay both the patterns on the lining and cut out on the pattern lines. Cut out two circles.

3. Cut out two circles in cardboard similar to the pattern.

Making up.—

1. Draw a design in each felt circle as suggested in Fig. 1 and work it with the coloured wools, or appliqué the same design, using different colours of felt cloth.

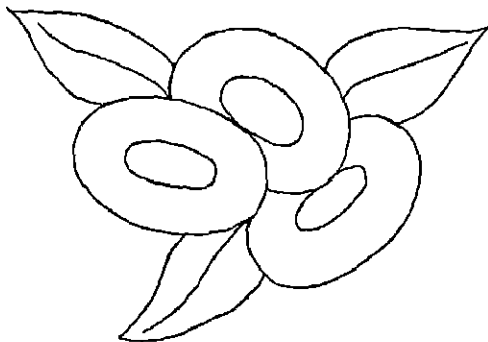


FIG. 1

2. Draw a design for the lid of the case to correspond with that in the circle; work it or appliqué it along one narrow side of the felt oblong as shown in Fig. 2.

3. Place a gathering thread along the edge of each felt circle in ordinary sewing cotton of a similar colour to the felt; lay the cardboard circle to the wrong side of the felt, place the lining circle on the top of the cardboard, and draw up the gathering thread so that the felt edge lies flat on the lining. Loop-stitch the felt to the lining, working a fancy loop stitch in two colours of wool.

4. Place the oblong lining to the wrong side of the felt oblong, turn over the edges

of the felt on to the lining, making mitred corners, and loop-stitch the two together in the same manner as the circles without allowing the stitches to show through on the right side, Fig. 3. Secure the mitred corners with very small sewing stitches.

5. Place each long edge round a circle and sew the two edges together with wool, leaving about $2\frac{1}{2}$ in. open to allow the shoe-cleaning materials to be inserted, Fig. 3.

If desired, another line of sewing stitches may be worked in the reverse direction.

6. Cover a button mould with felt cloth in the following manner:—

Cut out a felt circle with diameter $\frac{1}{2}$ in. wider than that of the button and place a gathering thread in ordinary cotton all round the edge, Fig. 4A. Cover the mould with the felt and draw up the thread tightly, ending off with two back stitches. Work a few lacing stitches across the mould from one felt edge to the other to hold the felt in position, Fig. 4B. Cut out a circle of felt slightly less than the mould, place it over the lacing stitches and hem it down to the felt turnings with ordinary cotton, Fig. 4C.

7. Make two loops of wool, one at each end of the lid about $1\frac{1}{2}$ in. away from the side edge.

8. Stitch the buttons on the case to correspond with the loops, Fig. 5.

The case is suitable for holding two tins of boot polish (brown and black), a brush, and a polishing duster, Fig. 3.

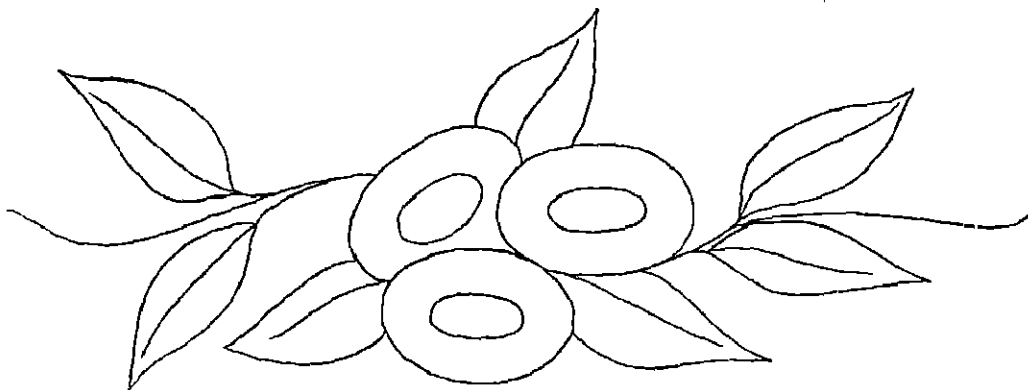


FIG. 2

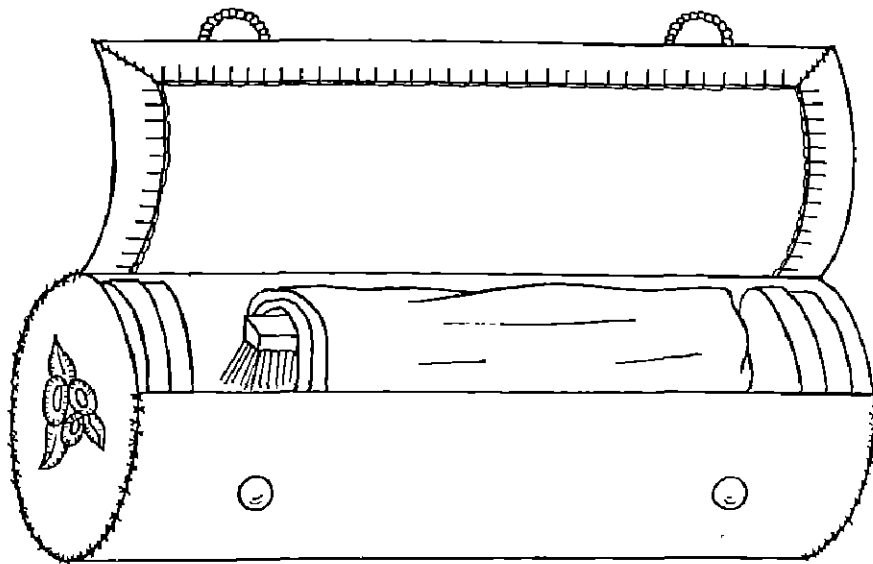


FIG. 3

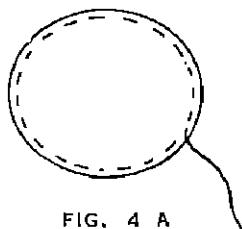


FIG. 4 A

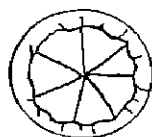


FIG. 4 B

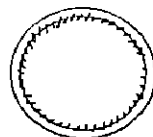


FIG. 4 C

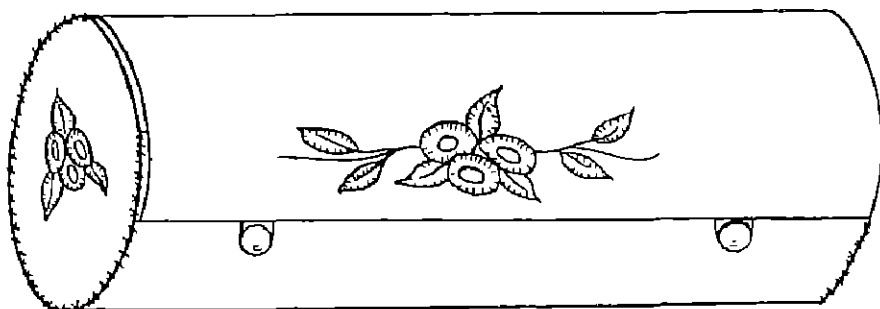


FIG. 5

WORK BAGS

STYLE 1

Teacher's requirements.—A piece of hessian; small piece of flannel; a piece of cardboard; one dozen curtain rings; coloured wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler; suitable designs illustrated on a chart; completed Work Bag.

Children's requirements.—A piece of crash; embroidery wools; needle; scissors; thimble; pins; piece of flannel; one dozen bone rings; a piece of cardboard; drafting paper; pencil; ruler.

The pattern.—

1. Draw and cut out an oblong 35 in. by 20 in.
2. Draw a square with side $4\frac{1}{2}$ in. From each bottom corner measure $1\frac{1}{2}$ in. along the

base and side lines, and join each of these points up to form a shield-shaped piece.

Cutting out.—

1. Place the oblong on the material and cut out, allowing $\frac{1}{2}$ in. turnings all round.
2. Place the shield pattern on the material and cut out six shields, allowing $\frac{1}{2}$ in. turnings all round.
3. Cut out three shields in cardboard exactly like the pattern.

Making up.—

1. Turn a hem on the right side of the material on the short sides of the oblong. Using the embroidery wools, hold the hems in position by means of couching.
2. Fold the material lengthways to find the front and back of the Bag, and on one side, or both, work a bold design such as is shown in Fig. 1.
3. Along each long side, $\frac{1}{2}$ in. from the edge, place a line of running stitches in wool,

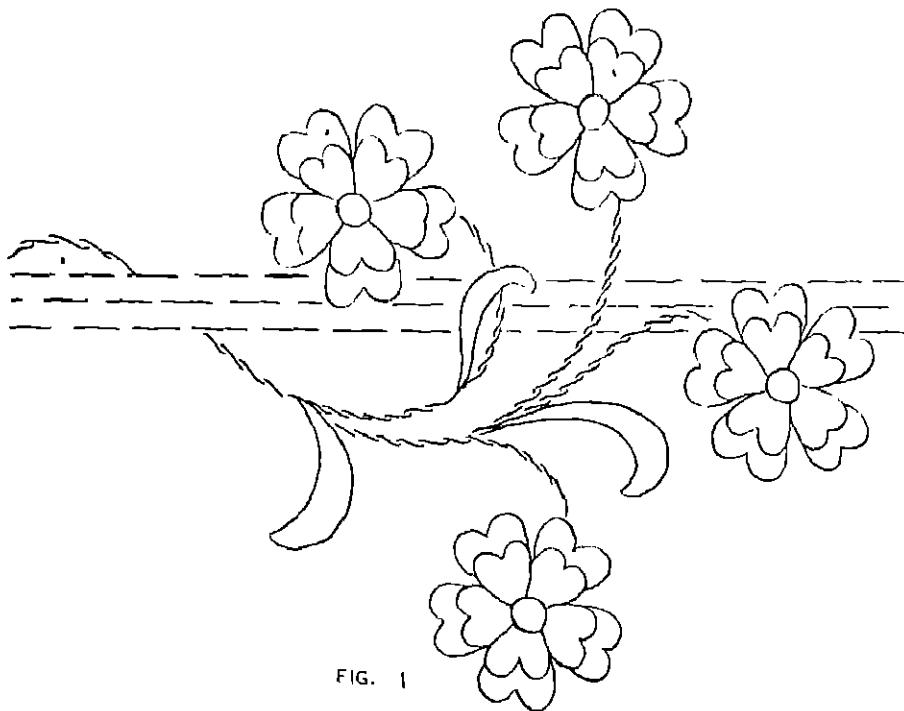


FIG. 1

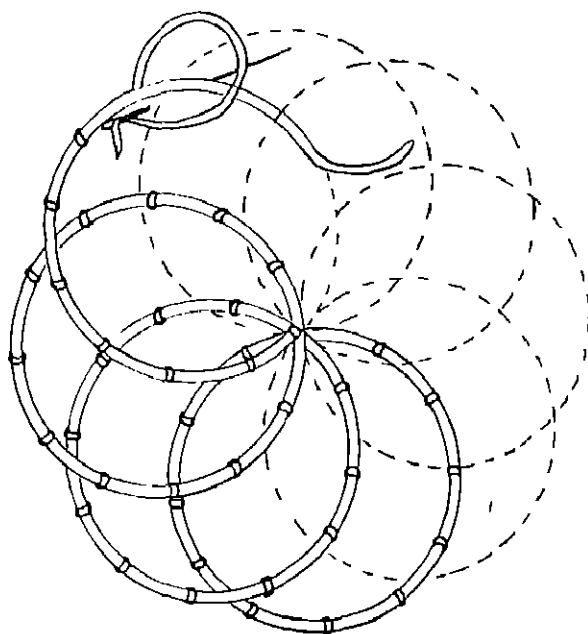


FIG. 2

and under this line place two more lines of running stitches $\frac{1}{2}$ in. apart, also in wool.

4. In the centre of two of the linen shields draw a design as shown in Fig. 2, and couch the coloured wools along the traced lines.

5. Cover one side of two of the cardboard shields with linen, using one of the decorated pieces and one plain piece.

6. Draw up the gathering threads of the oblong piece to fit the curved edges of the shields which have just been covered. Space the gathers evenly, and pin a shield over the raw edges of each side. Hold the shields in position by means of closely worked loop stitches, Fig. 3.

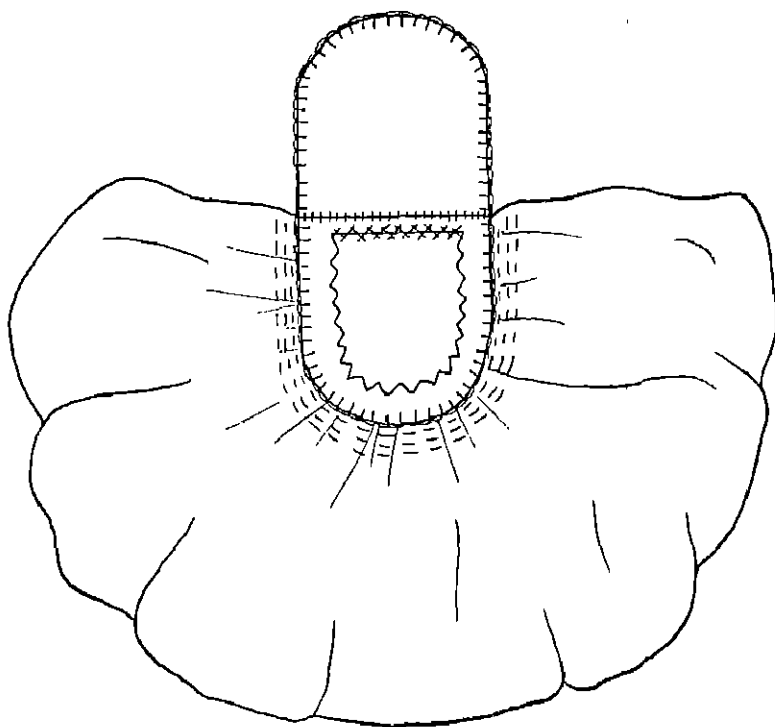


FIG. 3

7. To hide the raw edges, line the two shields with another plain material shield, first folding in the turnings and then attaching by means of small closely worked loop stitches.

8. Cover the third shield with the second decorated piece and line it with the remaining plain shield.

9. Place the third shield over the plain shield on the Bag, top to top, and attach the two together with small closely worked loop stitches so that a flap is formed.

10. Cut the pieces of flannel the same shape as the shield, gimp the curved edges, and couch them or herring-bone them down along the straight side under the flap, Fig. 3. These form a needle and pin holder.

11. Attach six bone rings at even intervals along each hemmed edge of the bag by buttonholing them to the folded edge, Fig. 4.

12. Make one long cord from twisted wools and insert it through all the rings to form a handle which draws up the Bag, Fig. 5.

STYLE 2

Teacher's requirements.—A piece of hessian; piece of material for lining; pair

of wooden or cardboard handles; coloured wools; needle; scissors; thimble; pins; embroidered design on the blackboard or on a chart; completed Work Bag; drafting paper; ruler; pencil.

Children's requirements.—A piece of coarse linen; piece of material for lining; pair of wooden handles; embroidery wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler.

The pattern.—Draw and cut out an oblong 18 in. by 13 in. Draw and cut out another oblong 7 in. by 5 in.

Cutting out.—

1. Place the long side of the oblong to the fold of the material and cut out, allowing $\frac{1}{4}$ in. turnings all round.

2. Cut out a similar piece in lining, and cut out the smaller oblong in lining, allowing $\frac{1}{4}$ in. turnings.

Making up.—

1. Machine a hem along one long edge of the small oblong. Tack down the remaining turnings and place the oblong with the length across the width of the lining and about 5 in. away from one short side of the lining, having

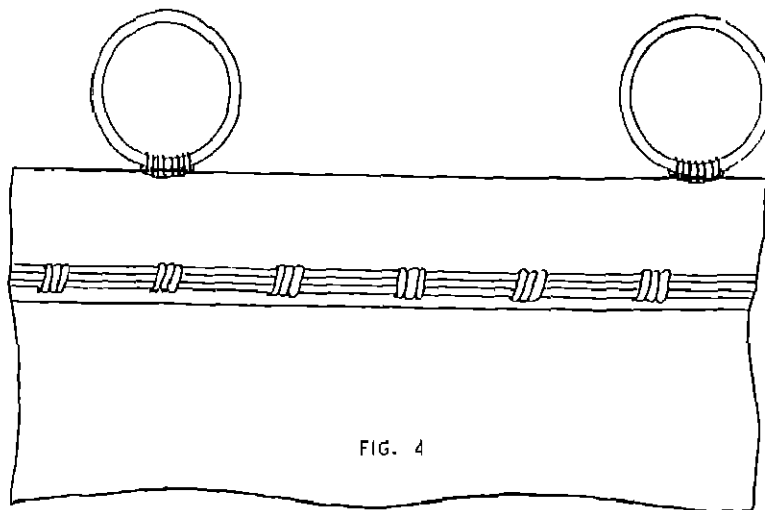


FIG. 4

hemmed edge at the top. Machine the short sides and the bottom to the g. Form one or two pockets by further lining.

Work a design on the linen such as is shown in Fig. 6. Trace a vandyked pattern two or three times along the lining on each side of the "fold"; i.e., on back and front of the Bag. Fill in the spaces with rows of straight stitches. This

is a simple design and its beauty lies in the choice of colours of wool. If harmonising tones of one colour are used in each Vandyked portion the result is most effective.

3. Place the linen and lining together with the right sides facing. Machine along the two long edges and one short side, turn inside out, tack down the turnings of the remaining edges and slip-stitch them together.

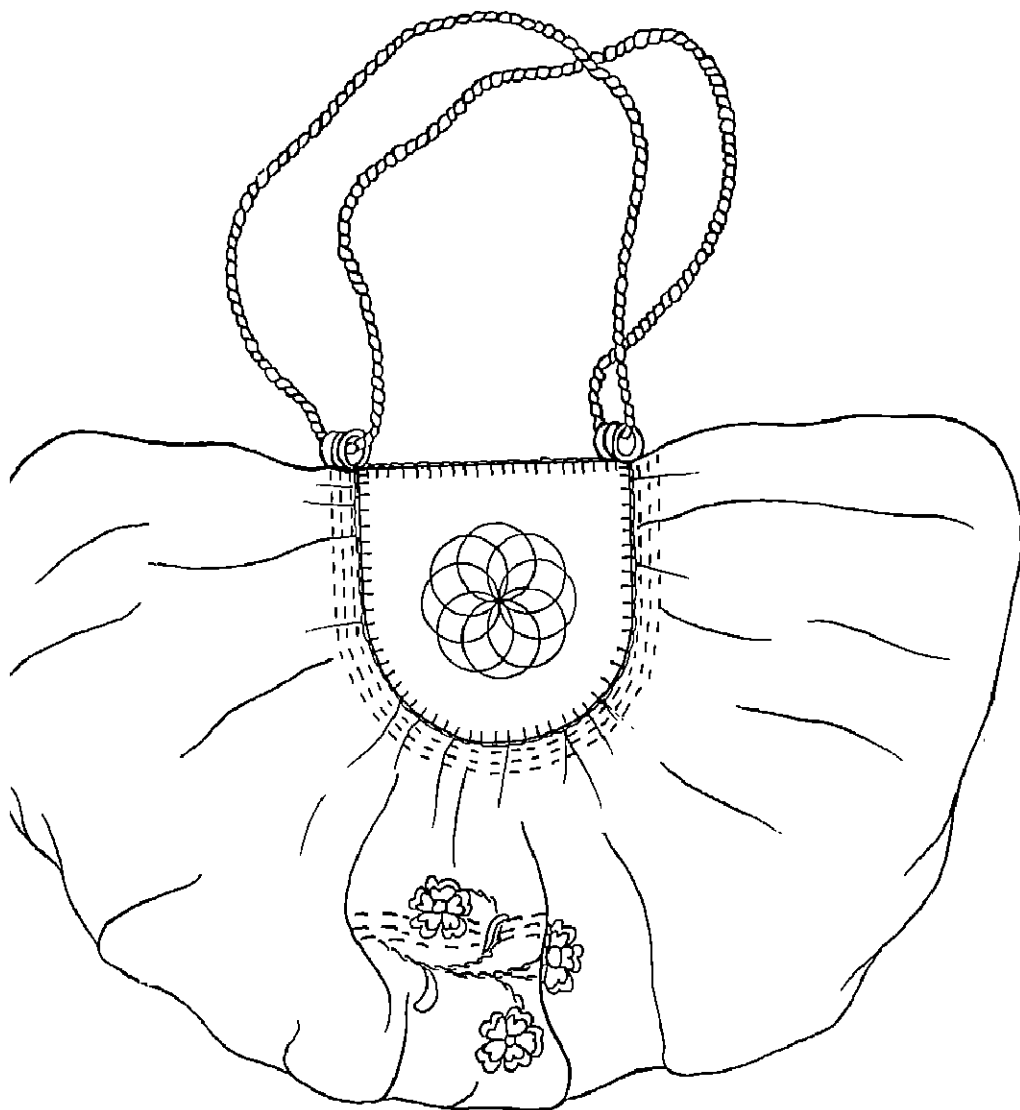


FIG. 5

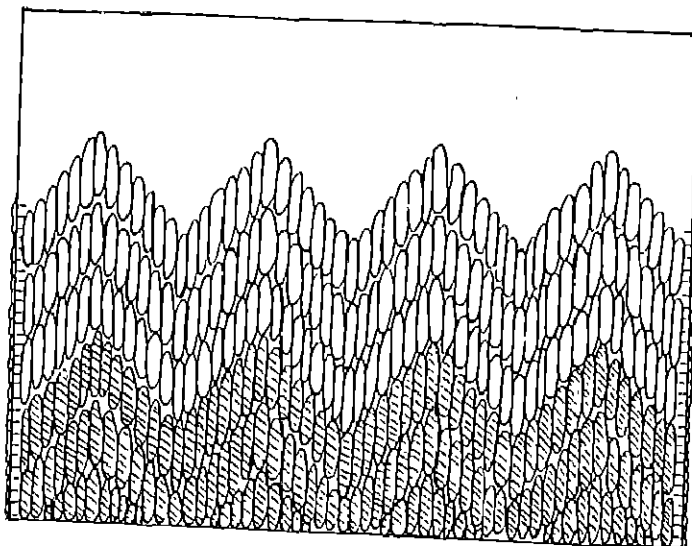


FIG. 6

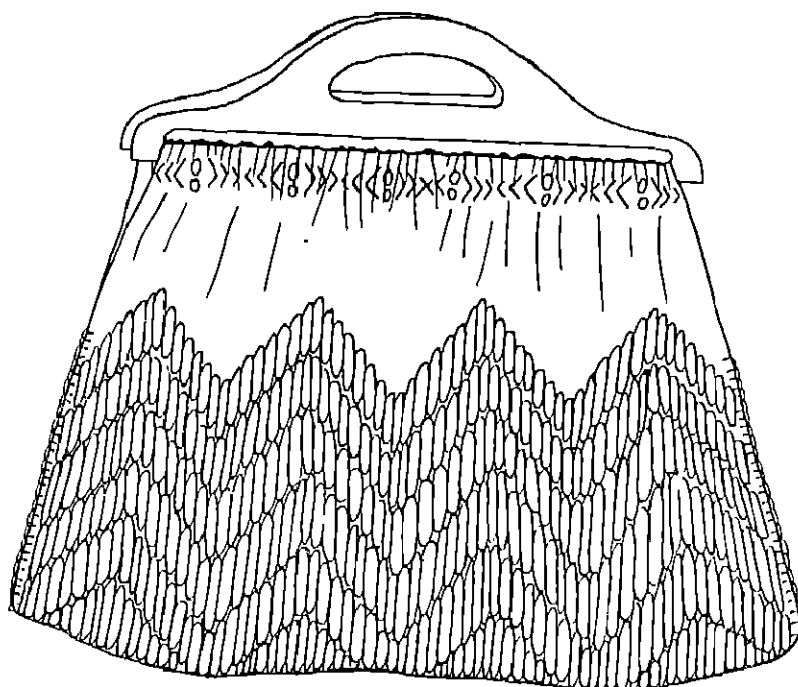


FIG. 7

4. Fold the Bag in two across the fold and join the sides together with loop stitches for a distance of 8 in. from the fold, Fig. 6. The loop stitches may be continued along the remaining side edges if desired, working each separately.

5. Pass each end of the Bag through the slot in each handle and fold over the material to the wrong side to form a hem. Tack this down, and hold it in position with any border stitch worked on the right side of the Bag, Fig. 7.

DARNING CASE

Teacher's requirements.—A piece of crash or hessian; coloured wools; needle; scissors; pins; thimble; piece of flannel or other material to represent it; drafting paper; ruler; pencil; designs and stitchery illustrated on a chart or blackboard; completed Darning Case.

Children's requirements.—A piece of felt cloth; piece of flannel; embroidery wools or silks; needle; scissors; thimble; pins; drafting paper; pencil; ruler.

The pattern.—Draw and cut out an oblong 8 in. by 7 in. and another oblong 7 in. by 2½ in.

Cutting out.—

1. Place the large oblong pattern on the felt and cut out, allowing ½ in. turnings all round.
2. Place the second oblong on the flannel and cut out on the pattern lines.

Making up.—

1. Fold over the ½ in. turnings on all edges on the right side of the felt, and tack.

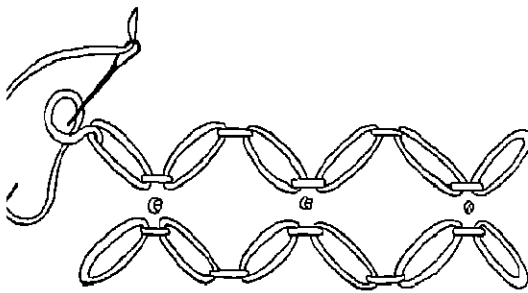


FIG. 1

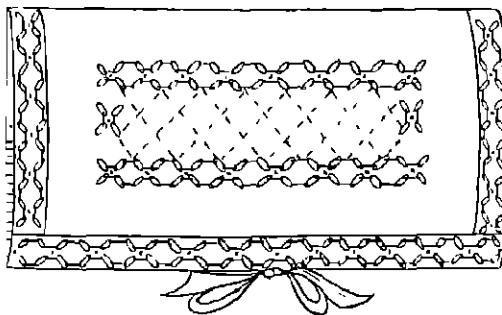


FIG. 2

2. Work two rows of zigzag cable chain stitching along these turnings as shown in Fig. 1. This stitch differs from the cable chain stitch in that the needle does not pick up the material in a continuous straight line, but each stitch is worked at an angle to the preceding one.

3. In the centre of each alternate group of four stitches work a french knot.

4. Turn up one of the short sides 1½ in. and blanket-stitch the edges together with very small stitches, thus forming a pocket in which may be inserted reels of silk for darning different colours of stockings.

5. In the centre of the felt forming the lid portion of the Case, work out a design based on the zigzag chain stitch, the centre portion being filled in with lines of stitching as in Fig. 2.

6. Gimp one long edge of the piece of flannel, lay it inside the lid, and blanket stitch the three remaining edges to the turnings of the hems of the three sides of the lid, thus forming a needle and pin holder, Fig. 3.

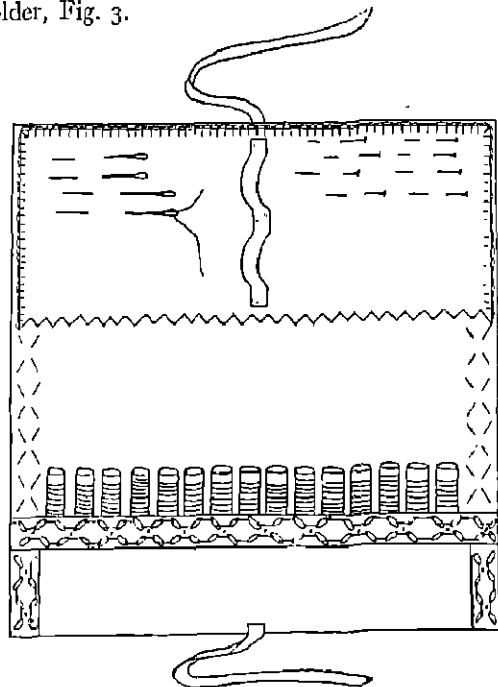


FIG. 3

7. Cut a narrow strip of felt and stitch it down the centre of the flannel piece only, to form two loops suitable for holding a thimble and a small pair of scissors, Fig. 3.

8. Cut two narrow strips of felt. Stitch one to the underside of the lid in the centre, and stitch the other to the centre bottom of the pocket. These are tied when the case is closed.

WRITING HOLD-ALL

Teacher's requirements.—A piece of crash; piece of cardboard; coloured wools; needle; scissors; thimble; pins; paper patterns; drafting paper; pencil; ruler; chart showing suggested decorative stitchery; completed Hold-all.

Children's requirements.—A piece of crash; piece of cardboard; coloured embroidery; silks or wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler.

The pattern.—This consists of a series of oblongs of varying sizes; viz., (1) 27 in. by 15 in.; (2) 14½ in. by 15 in.; (3) 9 in. by 4½ in.; (4) 5 in. by 4½ in.; (5) 8½ in. by 7 in.; (6) 4 in. by 1 in.; (7) 5 in. by 1 in., and a triangle with base 3½ in. and sides 2½ in.

Cutting out.—

1. Lay the patterns on the material and cut out, allowing ½ in. turnings all round except in the narrow strips where ¼ in. is allowed on the long sides. Cut out two oblongs of the No. 2 size.

2. Cut out two pieces of cardboard 12 in. by 15 in., and one piece of cardboard 8½ in. by 7 in.

Making up.—

1. On all the edges of the largest oblong turn a hem on the right side of the material and work the border as shown in Fig. 1 to hold the hems in position.

2. Fold the material widthways in half and work the border stitchery along the width to correspond with the hems, thus forming a "frame." The portion enclosed in this "frame" of stitchery is the front of the Hold-all.

3. Trace in the centre of the frame a design as suggested in Fig. 2, working over the traced lines in loop stitch, and working another row of loop stitches to face the first row round the centre circle, and part of each outside circle. Work a French knot in the centre of each figure.

4. Turn a hem along the two short sides and one long side on the right side of the material of the oblongs 16 in. by 15½ in., and work the border stitchery.

5. Turn a hem along one short side, on the right side of the material of the two oblong pieces 10 in. by 5 in. and 6 in. by 5 in., and work the border stitchery. Below these hems loop-stitch the edges of four interwoven small circles, Fig. 3.

6. Place the smaller oblong over the larger oblong, turn under the edges of the three remaining sides, and tack. Place them in position along the short side of one of the two large oblongs, about 1 in. away from the border stitchery. Loop-stitch them in position to form two pockets for holding envelopes, Fig. 3.

7. Turn a hem along the base of each triangular piece and work the border stitchery.

8. In the centre of each triangular piece, work a loop-stitched circle with a french knot in the centre. Turn under the remaining edges and tack, Fig. 3.

9. Place the triangles in position on the same oblong as the pockets to form the corners of an oblong 8½ in. by 7½ in. Loop-stitch them in position.

10. Cover with crash one side of the piece of cardboard 8½ in. by 7 in., gumming down the edges, and slip each corner under a triangular piece having the cardboard side underneath. This forms a pad for blotting paper which is inserted under the triangular corners.

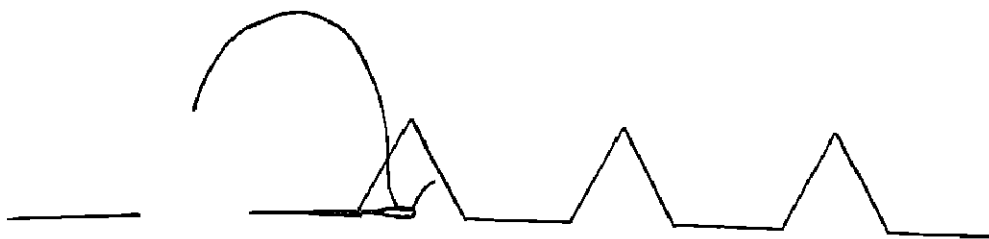


FIG. 1

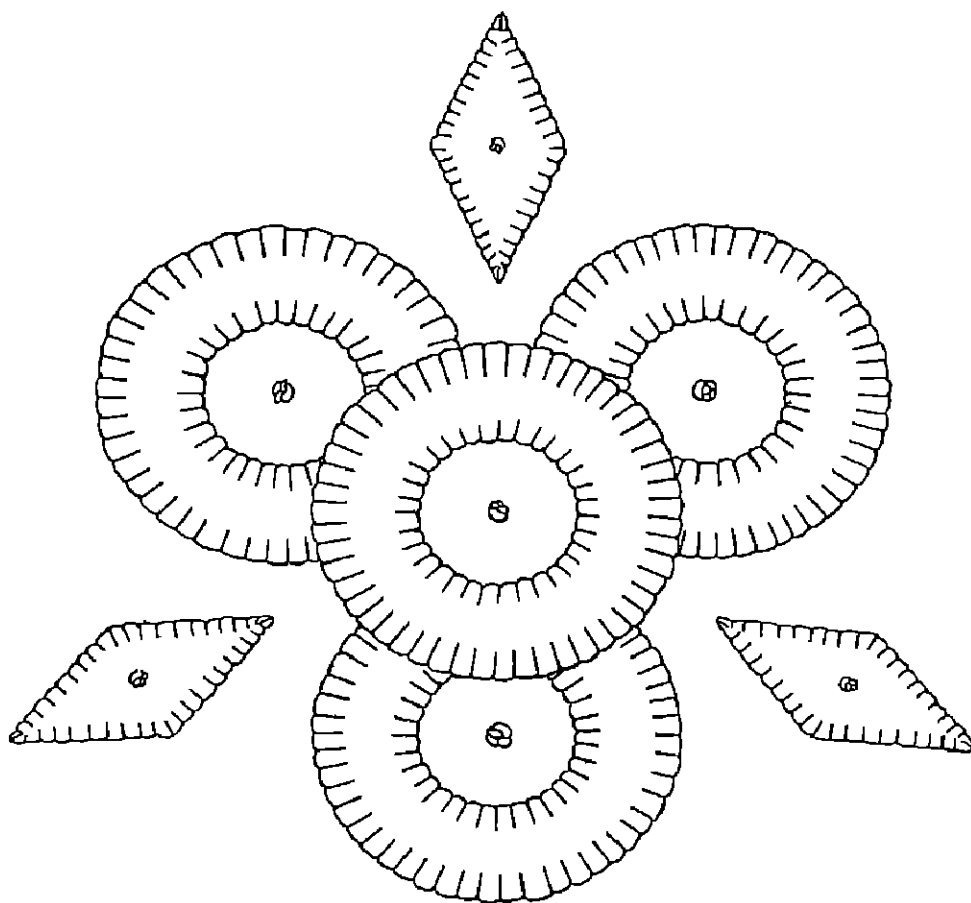


FIG. 2

11. Join each small strip to form a band, and work in the centre of each a loop-stitched circle.

12. Attach the strips above the blotter, one to form a holder for a calendar, and the other to form a holder for a pencil, rubber and pen, Fig. 3.

13. Turn the raw edges of the two oblongs 16 in. by 15½ in. over the cardboard edge for 2½ in., and gum down.

14. Place the plain oblong with the cardboard facing the inside of the front of the Hold-all cover and loop-stitch the edges together. This forms a pocket for a writing pad.

15. Place the oblong containing the envelope pockets, etc., to the back of the cover and loop-stitch the three edges together. This forms a pocket for letters to be answered, Fig. 3.

SERViette RINGS

Teacher's requirements.—A piece of hessian or crash; piece of soft canvas; piece of material to represent lining; coloured wools; needle; scissors; thimble; pins; designs suitable for Serviette Rings illustrated on a

blackboard or chart; drafted pattern; drafting paper; coloured pencil; ruler; buttons; several completed Serviette Rings.

Children's requirements.—A piece of linen; piece of soft canvas; piece of fine material suitable for lining; coloured embroidery silks; needle; scissors; pins; thimble; small pearl buttons; drafting paper; pencil; ruler.

The pattern.—Draw an oblong ABCD, AB = 6½ in.; BC = 1½ in.; AE = ½ AD; AF = DG = 1 in. Join EF and EG. Cut out on the pattern lines passing through the points EFBGGE, Fig. 1.

Cutting out.—

1. Place the pattern on the material and lining and cut out, allowing ¼ in. turnings all round.

2. Place the pattern on the canvas and cut out exactly on the pattern lines.

Making up.—

1. On each piece of linen trace a design as shown in Figs. 2, 3, 4, 5, 6, and 7. Embroider each design, using stitches with

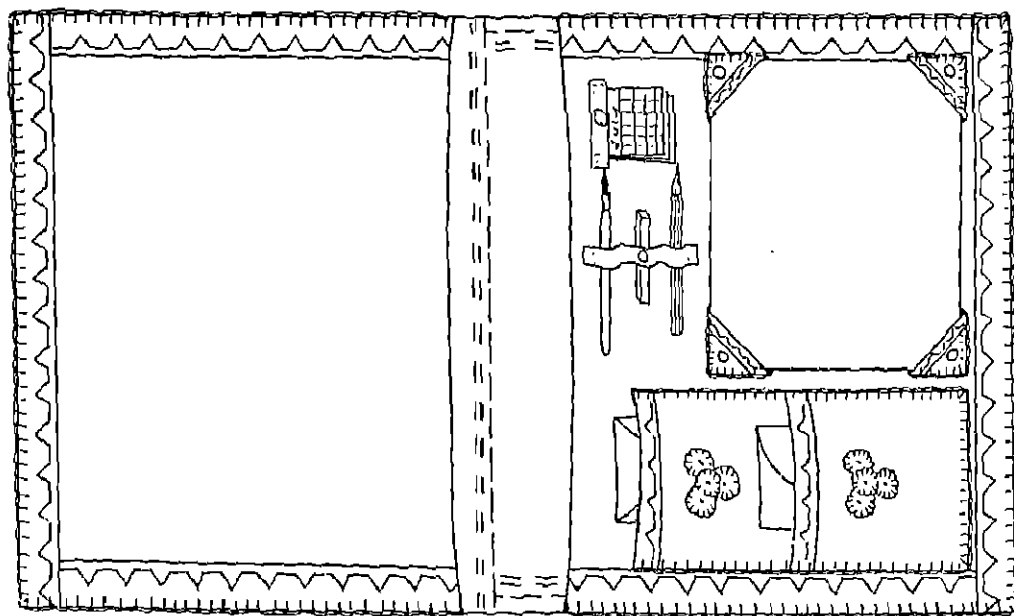


FIG. 3

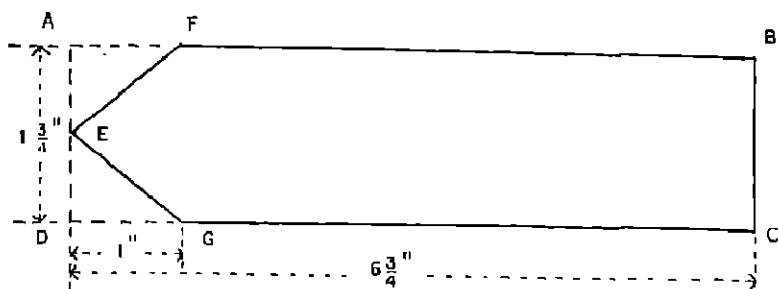


FIG. 1

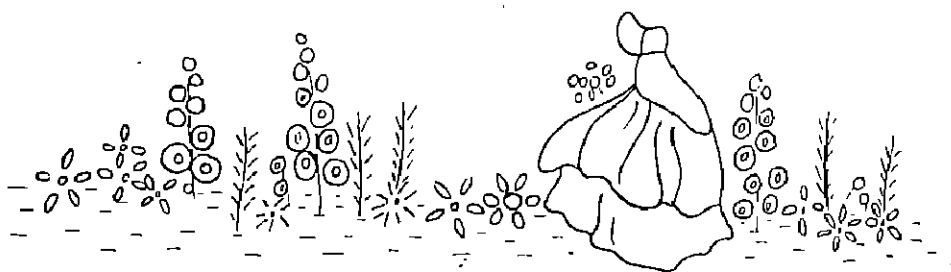


FIG. 2

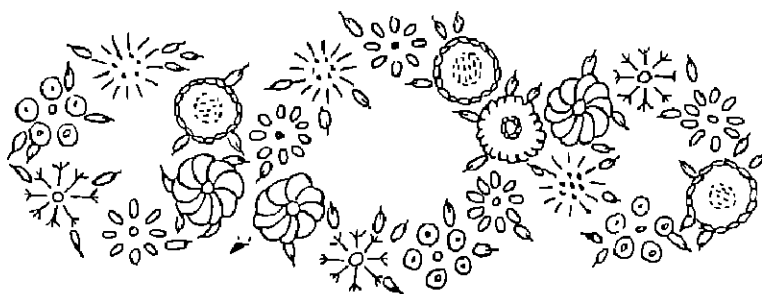


FIG. 3



FIG. 4

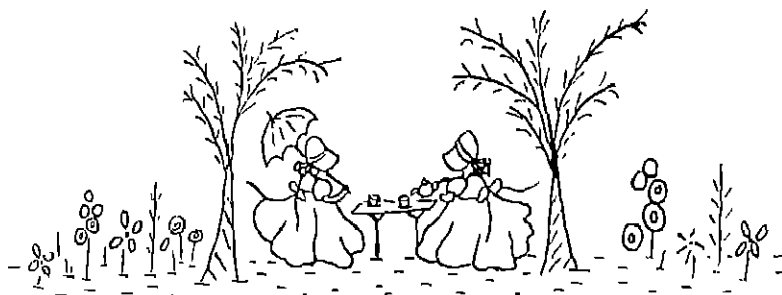


FIG. 5

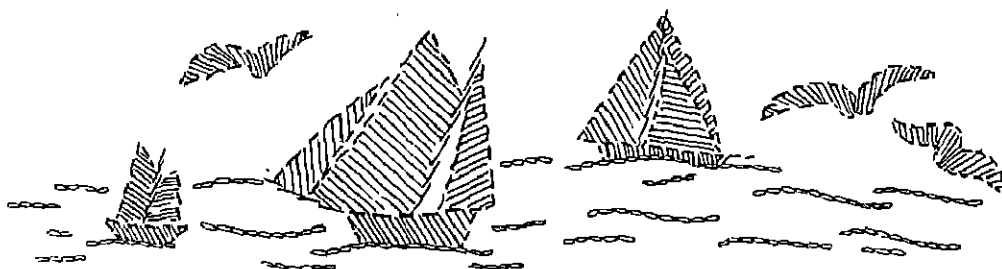


FIG. 6



FIG. 7

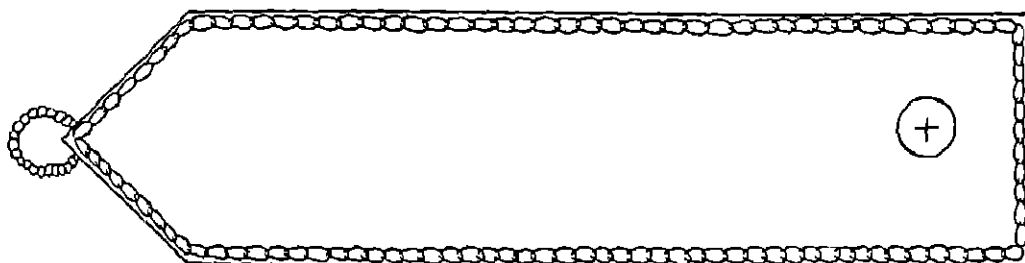


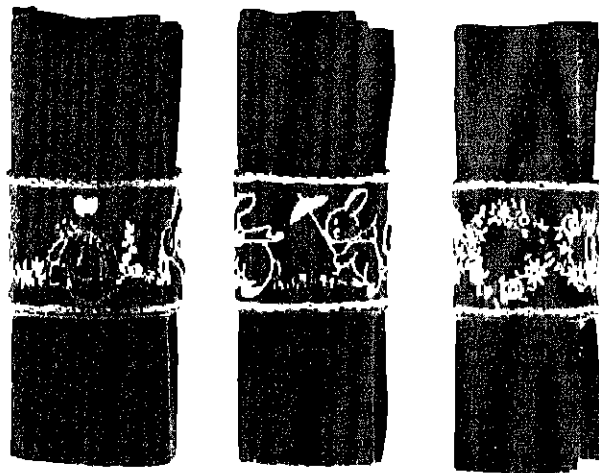
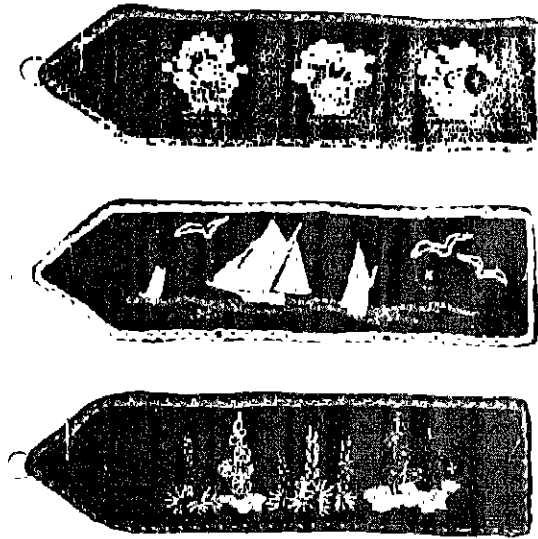
FIG. 8

which the pupils are already familiar; e.g., back stitching for outlining; satin stitch for fillings; loop stitch, satin stitch, fine chain stitch and lazy daisy stitch for flowers and leaves; fine chain stitch for the waves.

2. Place the canvas to the wrong side of

the linen, turn over the linen edges and catch-stitch them down to the canvas.

3. Work one row of chain stitching as close to the edge as possible, using different colours of silk to distinguish one Serviette Ring from another, Fig. 8.



SERVLETTE RINGS

4. Tack down the turnings of the lining on the wrong side, place it over the canvas and slip-stitch the edges together.

5. Make a loop at the pointed end, using the same colour of silk which was used for the chain-stitched edge, Fig. 8.

6. Fold the strip over to form the ring, mark the position for the button and stitch the button in place with the same coloured silk as the loop.

COMB CASE

Teacher's requirements.—A piece of hessian; piece of cardboard; piece of coloured material to represent the lining; coloured wools; needle; scissors; thimble; drafting paper; pencil; blackboard or chart with illustrations of decorative stitchery; completed Comb Case.

Children's requirements.—A piece of natural linen or crash; piece of canvas; piece of material such as casement cloth for lining; coloured embroidery silks; needle; scissors; thimble; drafting paper; ruler; pencil; comb.

The pattern.—

1. Measure the comb and draw and cut out in paper an oblong $\frac{1}{8}$ in. longer than the length of the comb, and $\frac{1}{4}$ in. wider than the width of the comb.

2. Find the centre of one short side and from this point measure $\frac{3}{8}$ in. on each side. Join these last two points with a curved line curving to $\frac{1}{8}$ in. in the centre.

Cutting out.—Using the paper pattern, cut out two oblongs in material and lining allowing $\frac{1}{4}$ in. turnings on all edges, and cut out an oblong in canvas exactly like the pattern.

Making up.—

1. On one of the oblongs of material draw a design such as is suggested in Figs.

1 and 2. In Fig. 1, fill in one kind of flower with long and short stitches and make french knots round the centre; work the other kinds of flowers in loop stitch and daisy stitch. Outline the leaves in back stitch and fill in with fishbone stitch to represent the veining. Work the stems in stem stitch. In Fig. 2 work the outer part of the berries in loop stitch, a fine chain stitch along the top, and the centre with satin stitch in a lighter shade. Use stem stitch for the stems, and fill in the leaves with herring-boning outlined with fine chain stitches.

2. Place the wrong side of the embroidered oblong to the piece of canvas, fold over the turnings neatly and catch-stitch them to the canvas without letting the stitches show on the right side. When folding over the curved portion at the top, snip the turnings so that they will lie flat.

3. Tack down the turnings of the lining, place it over the canvas, and slip-stitch along all the edges. Work fancy blanket stitch all round the edges, Fig. 3.

4. Treat the remaining half of the Comb Case in a similar manner, embroidering the material if desired.

5. Place the two halves of the Comb Case together, with the linings facing, and join the sides and the bottom with overcasting stitches worked through the blanket stitches.

POCHETTE

Teacher's requirements.—A piece of hessian or crash; piece of fairly stiff canvas; material suitable for lining; press stud; coloured wools; needle; scissors; thimble; pins; blackboard or chart showing illustrations of decorative stitchery suitable for the Pochette; pattern of the Pochette; drafting paper; coloured pencil; ruler; completed Pochette.

Children's requirements.—A piece of black moiré or very finely corded silk or a piece of linen; piece of fairly stiff closely woven canvas; piece of fine marocain or taffeta

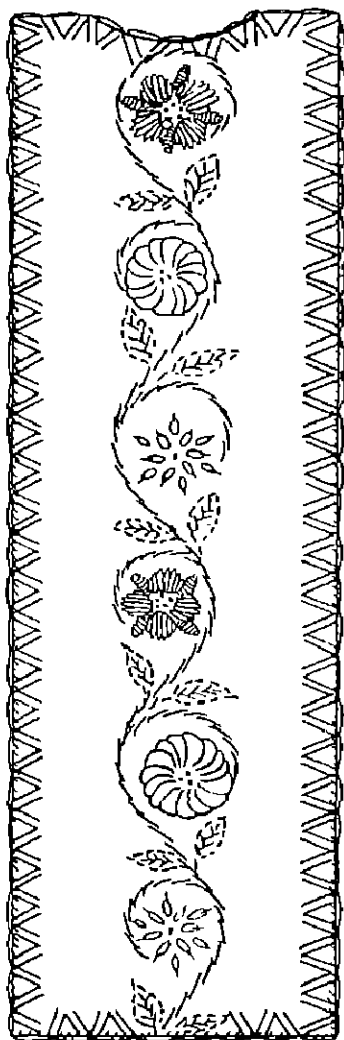


FIG. 1

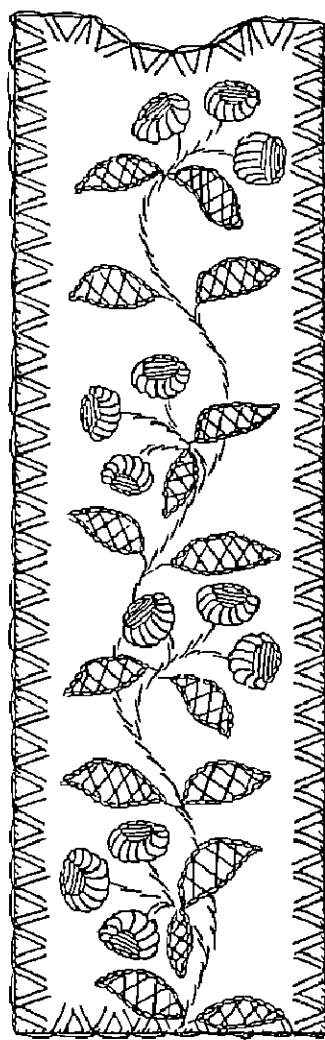


FIG. 2

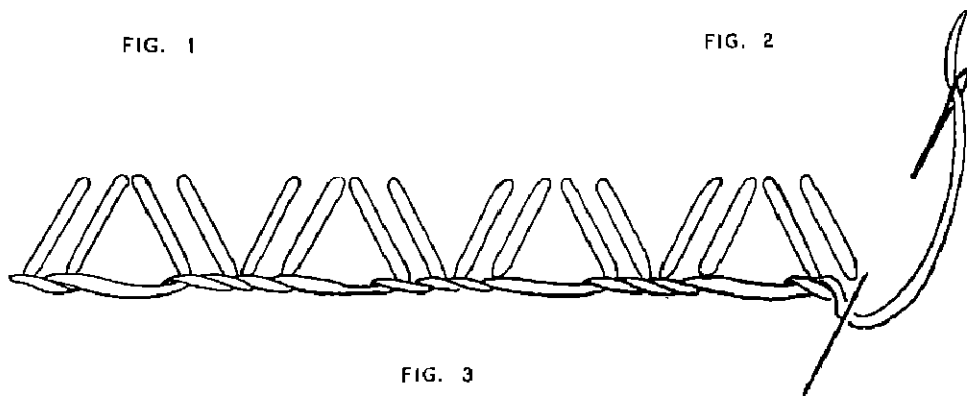


FIG. 3

silk for lining; a press stud; coloured embroidery silks; needle; scissors; pins; thimble; drafting paper; pencil; ruler.

Pattern.—

1. Draw and cut out an oblong ABCD, $AB = 7$ in.; $BC = 12\frac{1}{2}$ in.; from A measure $AE = 3\frac{1}{2}$ in.; from A and B measure downwards AF and BG = $1\frac{1}{4}$ in. Join EF and EG and cut away the triangular portions at the top, Fig. 1.

2. Draw a horizontal line $PQ = 1\frac{1}{2}$ in.; $R = \frac{1}{2} PQ$. Measure $RS = 3\frac{3}{4}$ in. Join PS and QS and cut out the triangular pattern, Fig. 2.

3. Draw another oblong 7 in. by $\frac{9}{10}$ in.

4. An alternative method of shaping the lid of the Pochette is by cutting out the oblong ABCD, measuring $AE = 3$ in. along the line AD, joining BE and cutting away

the triangular portion thus formed. If this shape is adopted then two press studs will be required to complete the bag.

Cutting out.—

1. Place the pattern of the Pochette on the material and cut out, allowing $\frac{3}{8}$ in. turnings all round. Cut a similar piece in the lining allowing $\frac{1}{4}$ in. turnings.

2. Cut out two triangular portions in material and lining, allowing $\frac{3}{8}$ in. turnings in the former and $\frac{1}{4}$ in. turnings in the latter.

3. Using the second oblong pattern and placing one long edge to the fold of the material, cut out a piece of material, allowing $\frac{1}{2}$ in. turnings along the short sides and $\frac{1}{4}$ in. turnings along the long side.

4. Cut out in canvas along the pattern lines one large oblong piece, two triangular portions, and one narrow oblong piece.

Making up.—

1. Trace a design such as is shown in Fig. 3 on the front of the lid of the Pochette

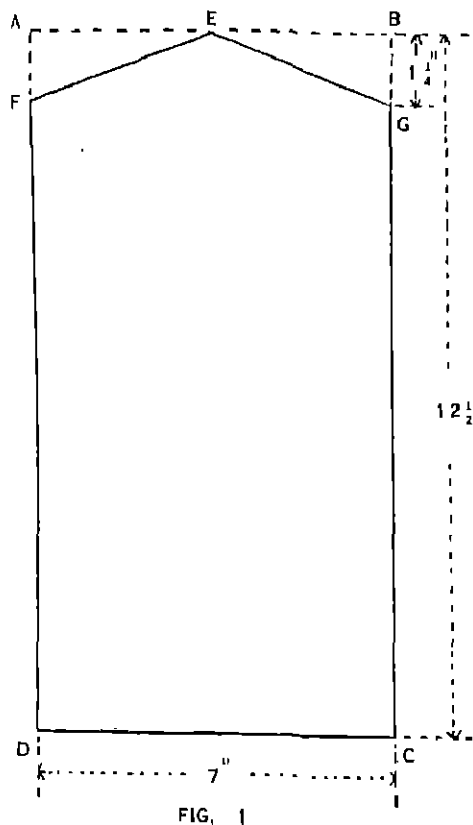


FIG. 1

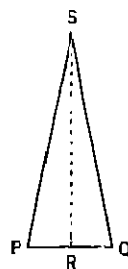


FIG. 2

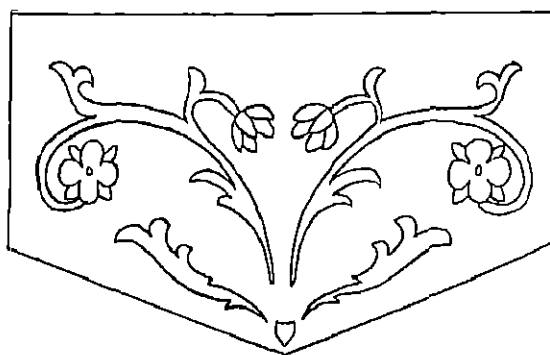
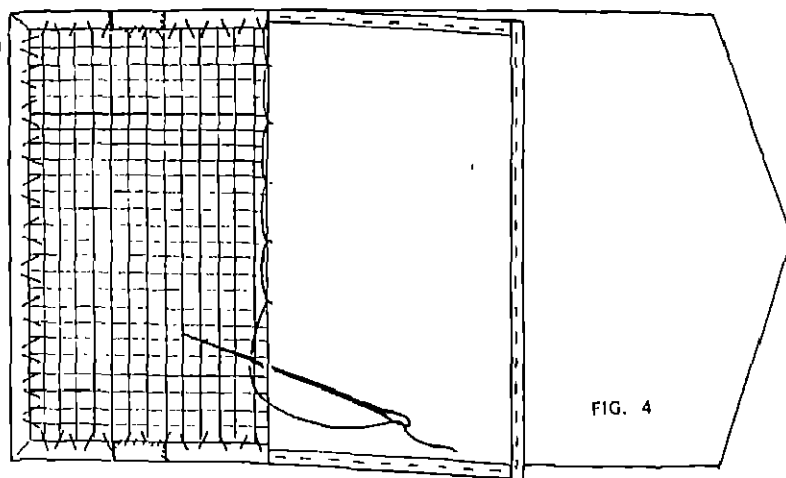


FIG. 3



and embroider it in very fine cross stitching. A very beautiful effect may be obtained by the choice of colours used.

2. For the Pochette and both the gussets, place the wrong side of the material to the canvas, turn over the edges and catch-stitch the turnings down to the canvas without letting the stitches show on the right side. Care must be taken to avoid bulkiness when folding the turnings over the point of the gusset.

3. Tack down the turnings of one long side of the remaining piece of material, place the remaining piece of canvas in the centre, fold over the material having the tacked

portion on the top, and slip-stitch it down to the under layer of material.

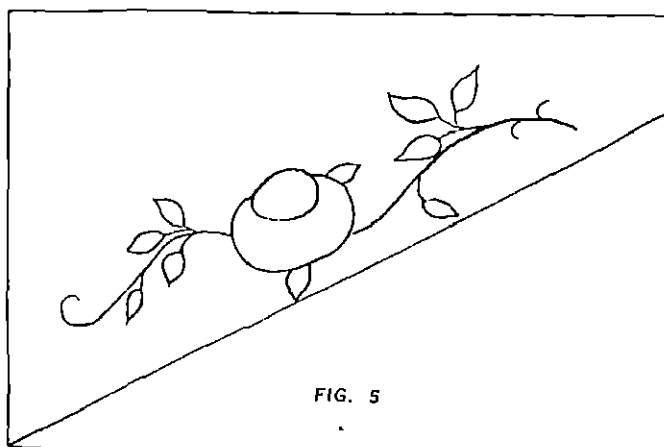
4. From the pointed end of the oblong, measure $4\frac{1}{2}$ in. down each side; i.e., from F and G respectively. Place the handle or strap in position over these points to lie along the back of the Pochette with the right side uppermost. Turn under the turnings and catch-stitch them down.

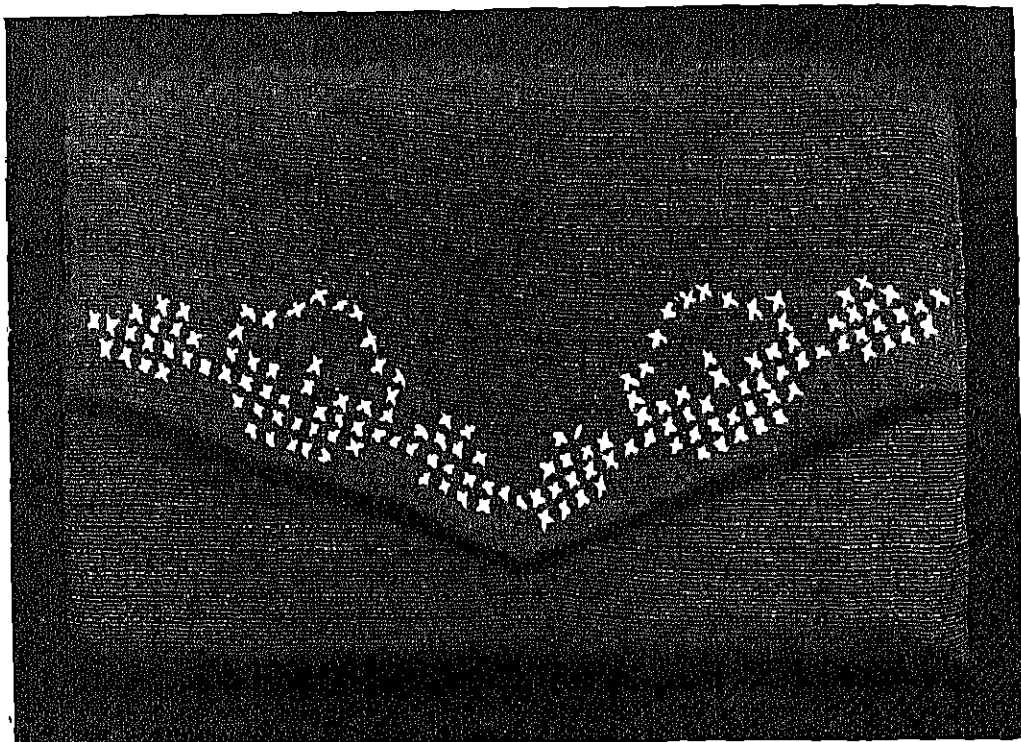
5. Tack down the turnings of the lining portions on the wrong side, place the linings in position over the canvas and slip-stitch them in position to the turnings of the material. Before completing the slip stitching, turn back the lining from the straight

short side to where the oblong will be folded to form the pocket, and catch the lining to the canvas with long loop stitches, Fig. 4. This prevents the lining from moving about inside the Pochette.

6. Fold the straight side over to a depth of 4 in. to form the pocket, place the gussets in position and slip-stitch the edges together.

7. Fold over the lid, mark the position and fix one or two press studs as required, Fig. 5.





POCHETTE

If desired the Pochette may be made without gussets, in which case the sides would be slip-stitched together.

If necessary, a small pocket for holding a mirror may be fixed to the lining before attaching it to the Pochette.

BEACH BAG

Teacher's requirements.—A sheet of drafting paper; ruler; coloured pencils; drafted pattern; enlarged pattern; blackboard showing the draft of the pattern in coloured chalk; piece of hessian; scissors; coloured wools; thimble; needle; pins.

Children's requirements.—A piece of crash ($1\frac{1}{2}$ yards will make two bags); coloured embroidery wools; needle; scissors; thimble; sheet of drafting paper; pencil; ruler; pins; tacking cotton.

The pattern.—

1. Draw and cut out an oblong ABCD, having $AB = 8$ in. and $BC = 19\frac{1}{2}$ in.
2. $BE = 1\frac{1}{2}$ in.; $AF = 9$ in. Join EF with a curved line. $FG = \frac{1}{2}$ FD. $CH = 2$ in. Join GH with a curved line. Cut out along the pattern lines, Fig. 1.

Cutting out.—

1. Fold the material lengthways in four equal parts and widthways fold it just enough to take the pattern plus $\frac{1}{2}$ in. turnings, Fig. 2.
2. Place the straight edge BC to the double fold, and the straight edge BE to the fold as in Fig. 2.
3. Mark $\frac{1}{2}$ in. turnings along the curved line from E to F, and $\frac{1}{2}$ in. turnings elsewhere, Fig. 2. Cut out on the lines of the turnings.
4. The shapings of the material obtained from the cutting out of the handle will form four pockets. Place the centre of the curved

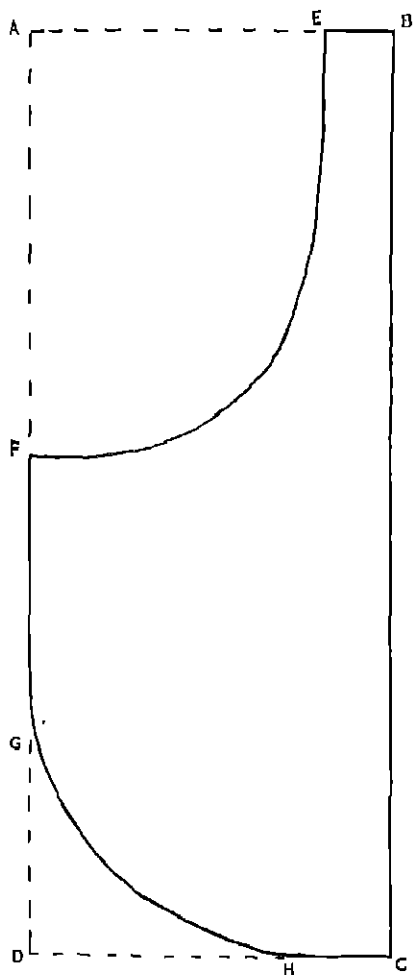


FIG. 1

edge of the shapings, E, to the centre of the base of the Bag, C, and cut out to correspond with the shape of the Bag along the outside edge, Fig. 2.

5. From the remainder of the material cut out 1 in. wide crossway strips of material to form $\frac{1}{2}$ in. wide facings when finished. From the long narrow strip cut out facings for the straight edge along the top of each pocket, Fig. 2.

If one Bag only is required it may be cut from $\frac{3}{4}$ yd. of material, the Bag being cut

from the width of material in two separate portions which will afterwards be joined in the centre of the handle. The facings may

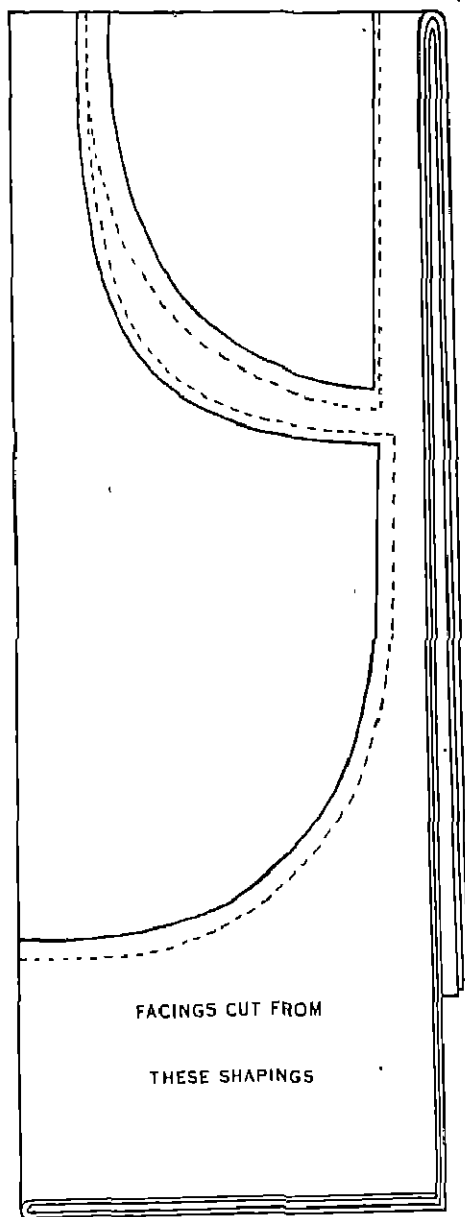


FIG. 2

be obtained from the shapings of the material, Fig. 3.

Making up.—

1. Face the curved edges of the top of the Bag and the handle with a crossway strip of material on the

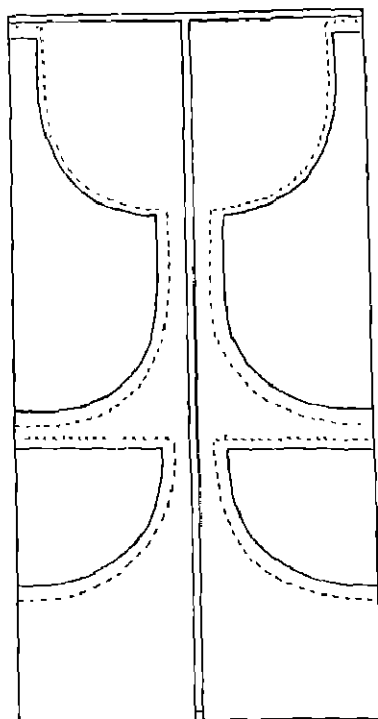


FIG. 3

right side of the Bag, and hold it in position with decorative stitchery such as is suggested in Figs. 4 and 5. In Fig. 4, the border is formed with chain stitches and herring-bone

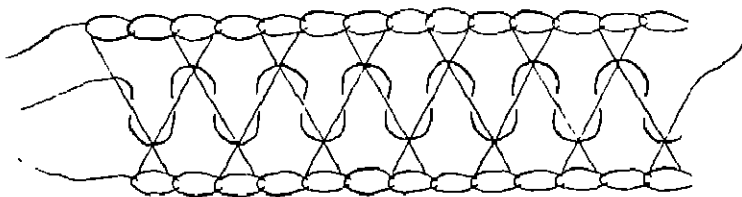


FIG. 4

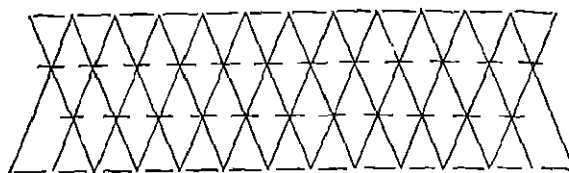


FIG. 5

stitches in different coloured wools, the latter being interlaced with another colour of wool. Fig. 5 shows a border consisting of couched close herring-bone stitches finished at either edge with back stitching, two or three colours of wool being used. These borders look most

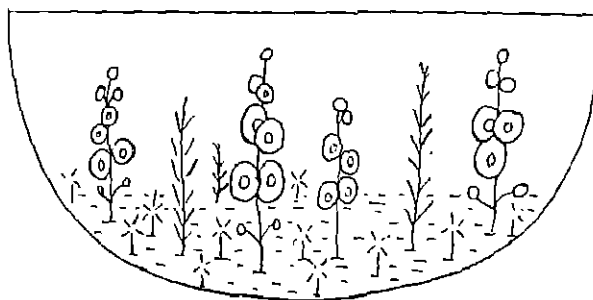


FIG. 6

effective if care is taken when choosing the colours of wool.

2. Face the straight edge along the top of both pockets with a straight strip of material, and work the same decorative stitchery.

3. Cut out a paper pattern of the pocket and on it draw a design representing a herbaceous border. Fig. 6 suggests one consisting of Virginia stock, lupins and hollyhocks. The Virginia stock is shown by four straight lines radiating from a common centre; the lupins are indicated by straight lines set obliquely along a centre line; the hollyhocks are formed by drawing round a half-penny, sixpence and three-

effective if care is taken when choosing the colours of wool.

penny piece to obtain the various sizes of flowers.

4. When the border has been designed, place the pattern on each of the pockets in turn with a layer of yellow carbon paper between the two, and trace the design carefully on the pockets. (*N.B.*—The design must be traced inside the turnings line, and, to keep within this, it is advisable to work a line of tacking stitches in ordinary cotton $\frac{1}{2}$ in. away from the edge to serve as a guide.)

5. Work the herbaceous border as follows:

Work lines of tacking stitches to represent the soil. Work the Virginia stock in daisy stitch with a French knot in the centre and fill in the stems and odd stalks with stitching. The lupins may be worked as daisy stitches, stem stitching being used

for the stems down the centre. Fill in each hollyhock flower with loop stitches, and the centre with three or four French knots. Work the stems of the hollyhocks in stem stitch and the buds in satin stitch.

6. When both the pockets have been worked, place the wrong side of the pocket in position to the right side of the Bag, and tack the curved edges together.

7. Divide the pockets into three portions, either three unequal portions; e.g., half and two quarters, or three equal portions. Stitch the pockets along these division lines to the Bag, thus dividing each pocket into three useful compartments.

8. Join the curved edges of the Bag (including the pockets) with a French seam. Fig. 7 shows the completed bag.

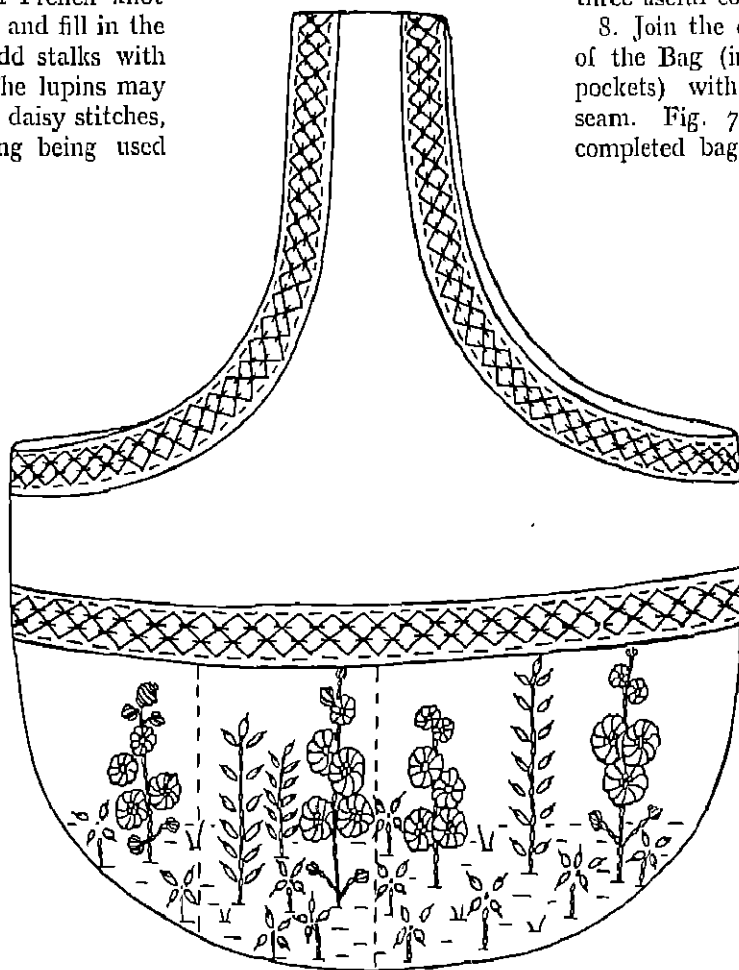


FIG. 7

BELT

Teacher's requirements.—A piece of hessian; coloured wools; needle; scissors; thimble; pins; piece of strong cardboard; designs suitable for the belt illustrated on the blackboard or on a chart; a completed Belt; a pattern of the buckle; the draft of the buckle shown on the blackboard or chart; drafting paper; pencil; ruler; wooden beads.

Children's requirements.—A piece of felt cloth, velvet or velour cloth; coloured embroidery silks or wools, or small coloured beads; needle; cotton; thimble; scissors; pins; piece of strong cardboard; drafting paper; pencil; ruler.

The pattern.—

1. For the Belt make an oblong about 22 in. by $2\frac{1}{2}$ in. Make one end pointed to the depth of 1 in.

2. Draw the pattern for the buckle as in Fig. 1.

Cutting out.—

1. Place the pattern of the buckle on the cardboard, trace round and cut out, using a sharp knife.

2. Place the pattern of the belt with the short straight edge to the fold of the material and cut out, allowing $\frac{1}{8}$ — $\frac{1}{4}$ in. turnings all round, one end only being cut pointed. Cut out a second piece.

3. Place the pattern of the buckle on the double material and cut out, allowing $\frac{1}{4}$ in. turnings on all edges.

Making up.—

1. On the right side of one of the buckle portions trace a design such as is shown in Fig. 2.

2. Work this in fine cross stitching, or fill it in with very small coloured beads.

3. Place the two portions of the buckle together with the right sides outside, and with the cardboard buckle between them, snip the turnings at each corner, turn in

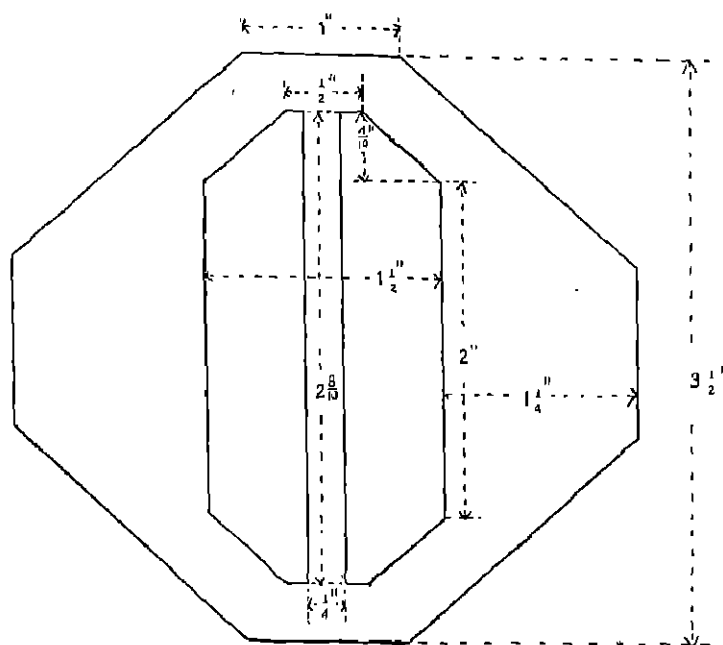


FIG. 1

the edges and slip-stitch them together.

4. Trace and work in a similar manner a large floral design as in Fig. 3, in the centre of one of the strips for the Belt. (The straight end must lie to the left of the Belt.) If desired, three smaller designs may be worked, one to lie in the centre back and the other two at each side.

5. Machine the two Belt portions together on the wrong side, leaving the straight end open. Turn inside out, slip-stitch the open edges together, and, if desired, machine a line of stitching all round the edge.

6. Place the straight end of the Belt round the bar of the buckle and hem it in position on the wrong side without letting the stitches show on the right side.

An alternative design for the Belt is given in Fig. 4, which may be worked all

round the belt or wherever fancy pleases. A corresponding small portion may be worked on the buckle, or the buckle may be left plain and have the edges blanket-stitched.

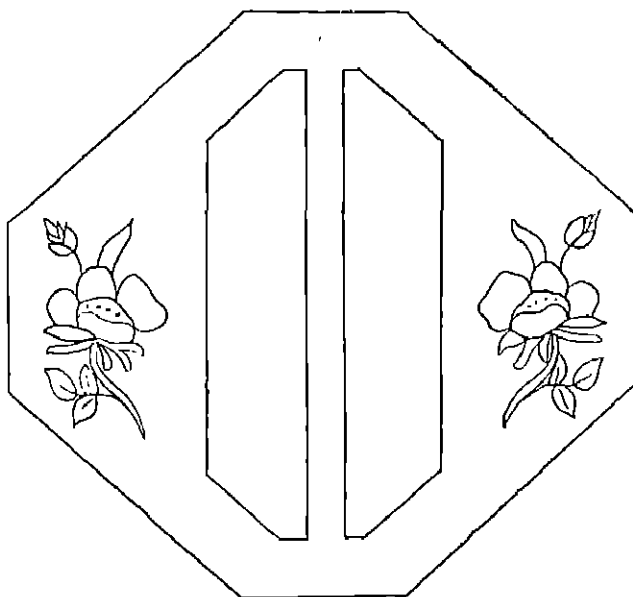


FIG. 2

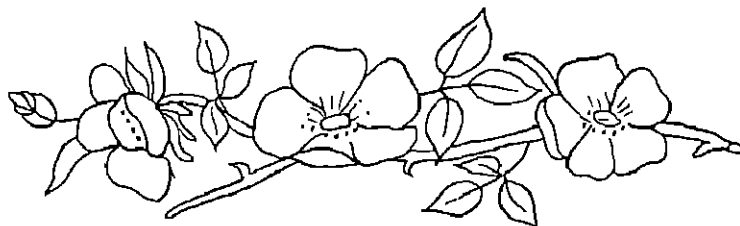


FIG. 3.

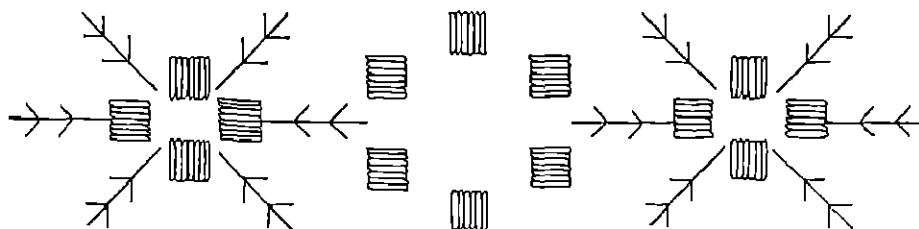


FIG. 4

TRAY CLOTHS

Teacher's requirements.—A piece of hessian; coloured wools; needle; thimble; scissors; pins; patterns; drafting paper; pencil; ruler; chart illustrating suitable designs; completed Tray Cloths.

Children's requirements.—A piece of linen; embroidery silks; needle; scissors; thimble; pins; drafting paper; ruler; pencil.

Making up.—

1. Work on all sides, $2\frac{1}{2}$ in. in from the edge, a line of blanket stitches alternating in three long and three short stitches.

2. In each of these loops work another line of blanket stitches in a different shade of silk, Fig. 1.

3. To the inside of the first line of blanket stitches work a third line in groups of five of varying sizes in a different shade of silk, Fig. 1.

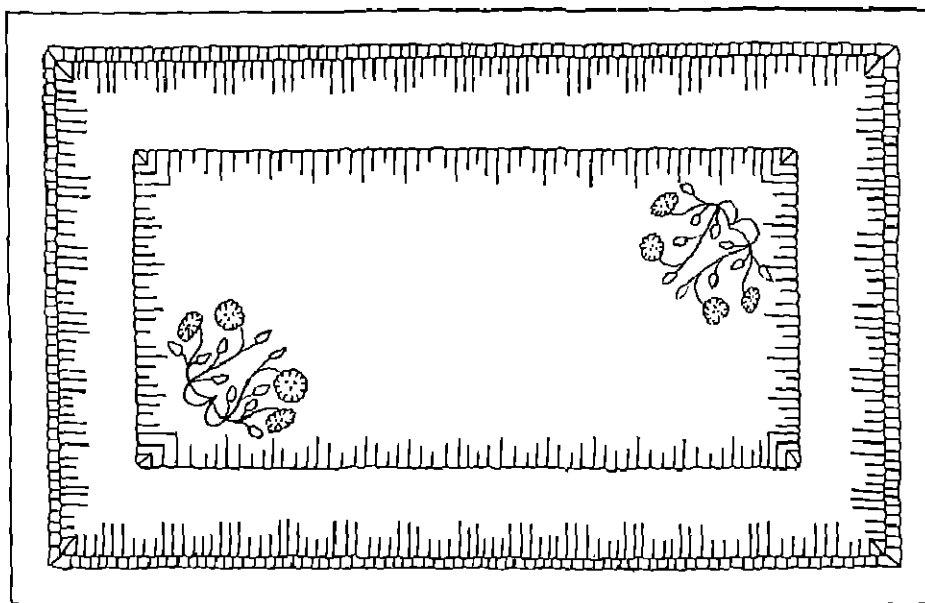


FIG. 1

The pattern.—Tray Cloths may take the form of oblongs or oval shaped pieces, and vary in size according to the purpose for which they are required; e.g., 14 in. by 20 in.; 16 in. by 24 in.; 18 in. by 27 in. The oval shaped pattern may easily be adapted from the oblong.

Cutting out an oblong tray cloth.—Cut out the material to form an oblong $16\frac{1}{2}$ in. by $22\frac{1}{2}$ in.

4. In two opposite corners, or in each corner if desired, trace a spray of flowers as in Fig. 2. Work the flowers in consecutive rows of loop stitches, using the same coloured threads as used in the border. Work a few french knots in the centre. Fill in the leaves with herring-bone stitch, outlining the shape afterwards with couching. Couch the stems also.

5. Turn back the edges of the Tray Cloth to form a hem on the wrong side of the

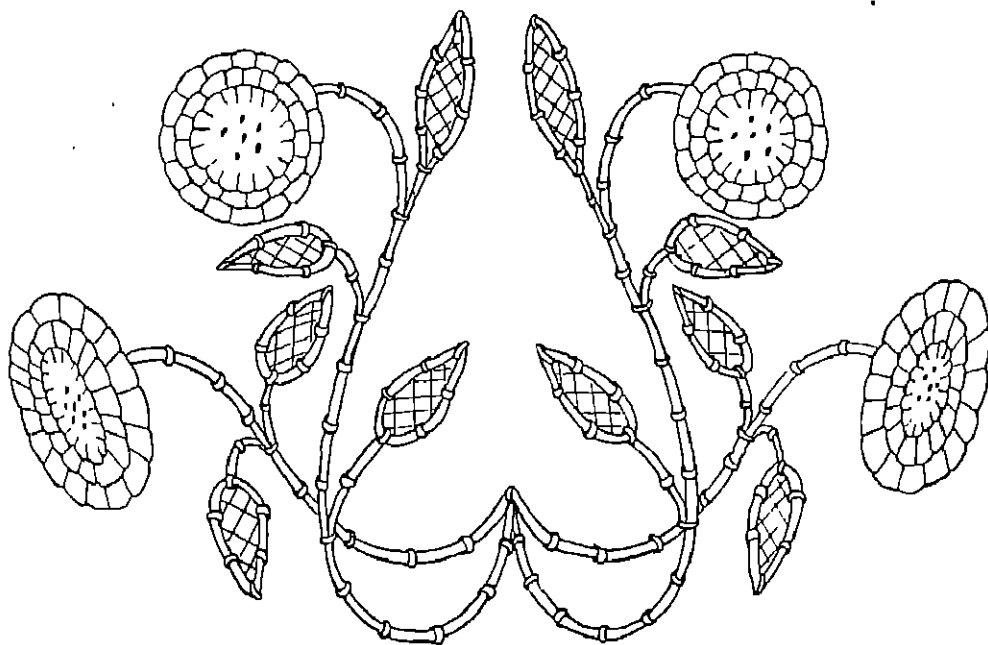


FIG. 2

material, mitring the corners and holding the hems in position with small hemming stitches worked in the end line of blanket stitching.

6. Fig. 3 shows another oblong Tray Cloth with the edges turned in a hem which is held in position with two-row blanket

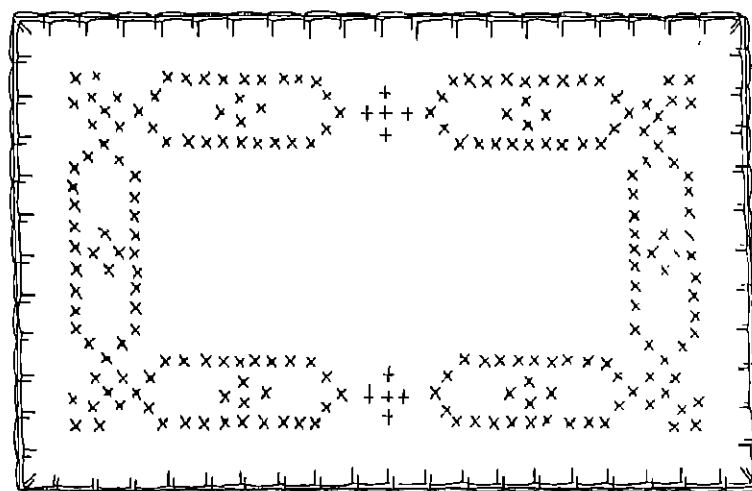


FIG. 3

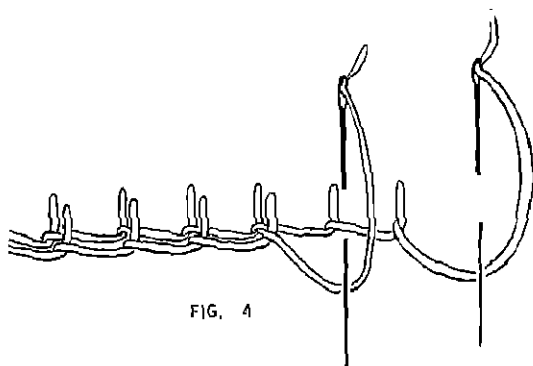


FIG. 4

stitching (Fig. 4) and decorated with a cross-stitched border.

7. For the oval Tray Cloth shown in Fig. 5, first work a scalloped edge in padded blanket stitch. About $1\frac{1}{2}$ in. in from the scalloped edge trace a design as shown in the figure all round the cloth. Outline the pattern in very small blanket stitches, and fill in the spaces with rows of darning stitches worked in another colour of silk. Cut away the surplus material from the scalloped edge.

HANDBAG

Teacher's requirements.—A piece of crash; piece of material for lining; large wooden or cardboard handle; coloured wools; needle; scissors; pins; thimble; pattern; drafting paper; pencil; ruler; braid; beads; completed

Handbag; chart showing sketches of suitable decorative designs.

Children's requirements.—A piece of black or coloured ring velvet; metal or celluloid frame; piece of taffeta silk or artificial silk for lining; narrow floral braid; embroidery silks (multi-coloured beads if necessary); needle; thimble; pins; scissors; drafting paper; pencil; ruler.

The pattern.

1. Measure the length across the top, inside the metal frame AB in Fig. 1., and the depth BC in Fig. 1. Draw and cut out an oblong to those measurements.

2. Draw an oblong PQRS, with side PQ = $2AB + \frac{1}{2}$ in., and side QR $\approx 4\frac{3}{4}$ in. or longer according to the size of the metal frame; PT = QV = $1\frac{1}{2}$ in.; QX = RY = PK = SL = 2 in.; RM = SN = 2 in. Draw in the pattern as in Fig. 2. Cut out.

Cutting out.

1. Place the oblong pattern on the material and lining and cut out two pieces allowing $\frac{1}{2}$ in. turnings all round.

2. Place the pattern of the Bag with NM to the fold of the material on both velvet and lining and cut out allowing $\frac{1}{4}$ in. turnings all round. The turnings at T and V must be cut as in Fig. 3.

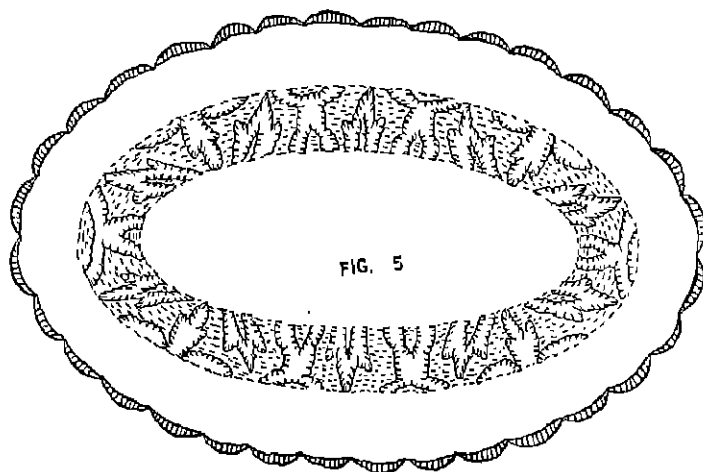


FIG. 5

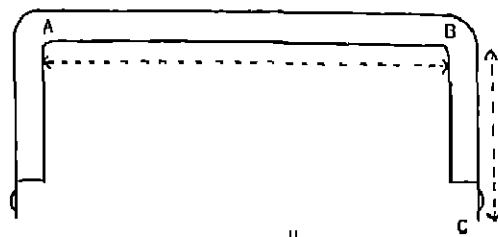


FIG. 1

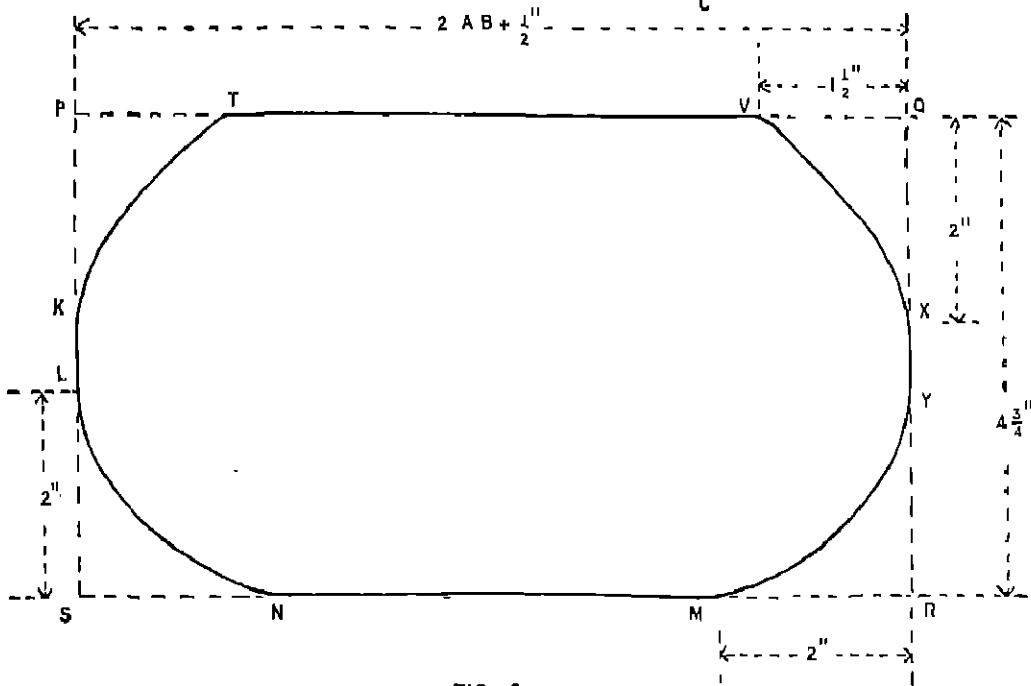


FIG. 2

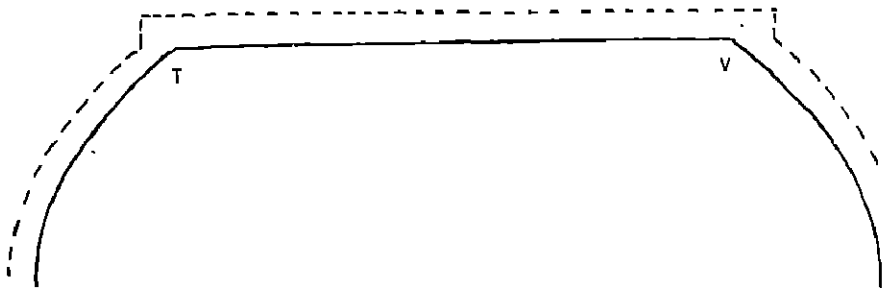


FIG. 3

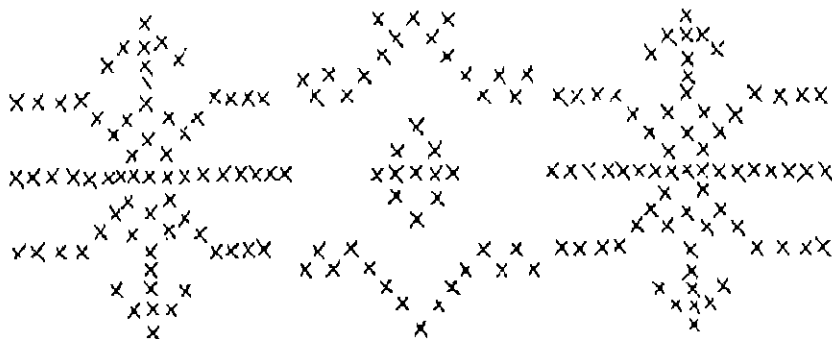


FIG. 4



FIG. 5

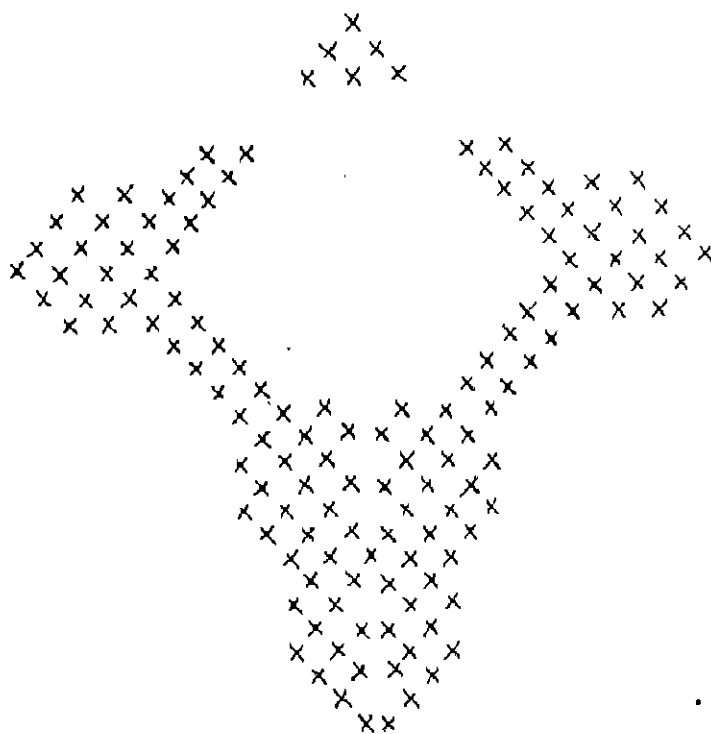


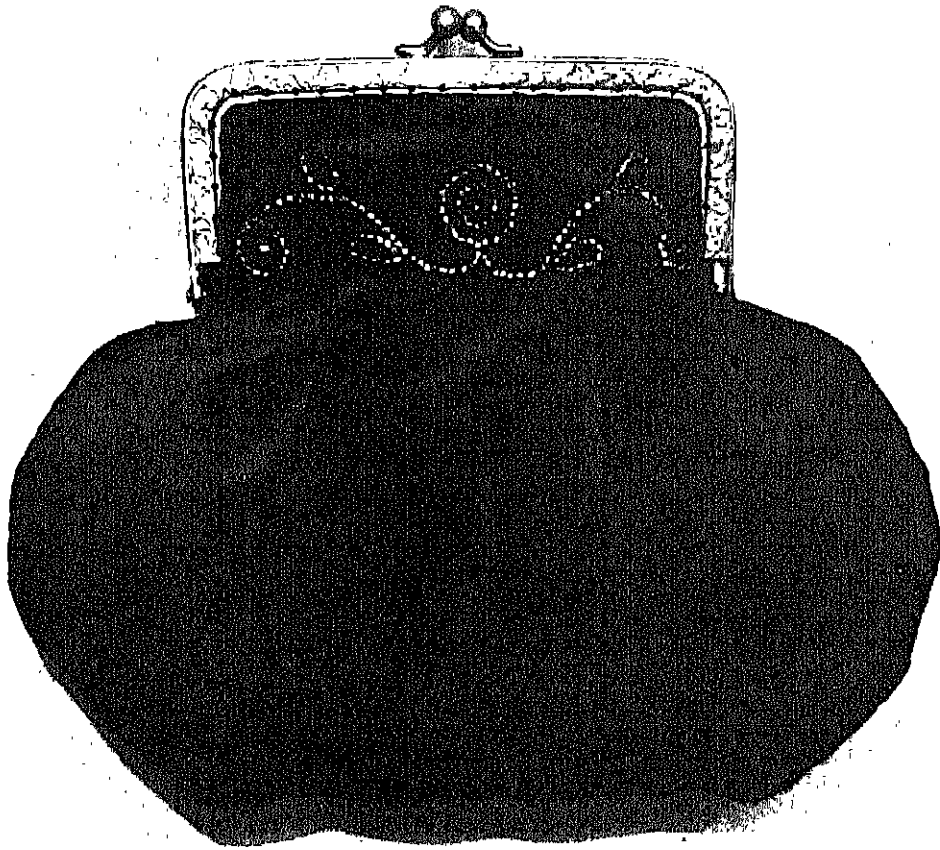
FIG. 6

Making up.—

1. On each velvet oblong embroider a design such as is suggested in Fig. 4. This may be worked in cross stitching or with very small multi-coloured beads. Fig. 5 shows the method of sewing beads on singly, a back stitch being taken with each bead.

2. Join one velvet oblong and one lining oblong together along three sides, taking up $\frac{1}{4}$ in. turnings only. Turn inside out, and tack down the $\frac{1}{2}$ in. turnings of the lower edge on the wrong side of each material as when making a band. Treat the second oblongs in the same way.

3. Fold the velvet Bag in two with the wrong side uppermost and machine the sides together. Snip carefully the turnings at T and V. Turn inside out. If preferred, a design may be embroidered on the bag portion as well as, or instead of, the one on the oblong portion, Fig. 6. Join the sides of the lining in the same way.



HANDBAG

4. Place the lining bag inside the velvet bag with the wrong sides together; arrange it carefully in position so that the turnings of each portion lie exactly on each other, and tack the straight edges together.

5. Fix each side of the Bag into one of the velvet "bands," tack in position and slip-stitch the band to the Bag on both right and wrong sides with very small stitches. The superfluous material may be arranged to form a box pleat about 1 in. away from the centre of the band, or if preferred, it may be arranged in very fine gathers.

6. Place each "band" under the metal handle to a distance of $\frac{1}{4}$ in., and stitch it to the handle with black or coloured

embroidery silk, making back stitches through the holes. These stitches are stabbed through.

7. Arrange the floral braid to cover the stitches showing on the lining of the Bag and stitch it neatly in position.

DRESS HANGER AND COVER

Teacher's requirements.—A piece of hessian or crash; wadding; coloured wools; needle; scissors; thimble; pins; coat hanger; drafting paper; pencil; ruler; pattern; suggestions for embroidering the cover shown on a chart; completed Hanger and Cover.

Children's requirements.—A piece of artificial silk; embroidery silks; sewing cotton; needle; scissors; thimble; pins; coat hanger; wadding.

The pattern.—Draw an oblong ABCD, AB = 20 in., BC = 9 in. Find P, the centre of AB. PE = PF = $1\frac{1}{2}$ in.; DG = CH = 2 in. Draw in the pattern as shown in Fig. 1.

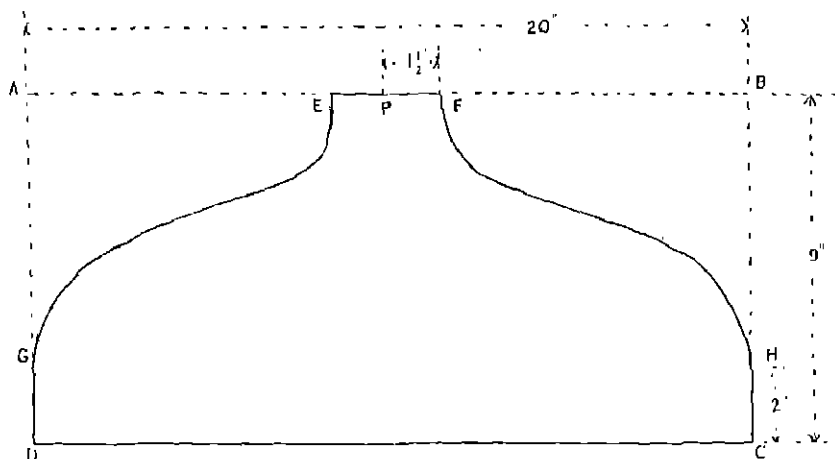


FIG. 1

Cutting out.—

1. Place the pattern on the material and cut out two pieces, allowing $\frac{1}{8}$ in. turnings on all edges except EF where no turnings are allowed.

2. Cut a strip of silk in length equal to $1\frac{1}{2}$ times the length of the coat hanger and 4 in. wide.

a gathering thread $\frac{1}{8}$ in. away from the folded edge. Draw this thread up until the strip just fits the under-side of the coat hanger. End off the thread.

3. Regulate the gathers, placing the centre tack mark just under the hook of the hanger, and pin the strip in position to the coat hanger.

4. Place the turned-in edges together with the coat hanger between, and join them with a gathering thread on each side of the hook, Fig. 2.

5. Join the two pieces of the cover along the curved edges with a French seam. Bind the edge of the "neck" with a narrow strip of the same material.

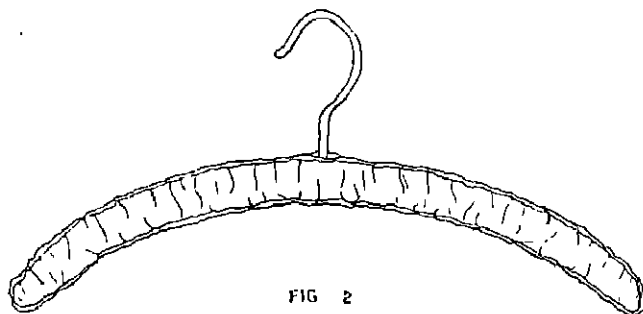
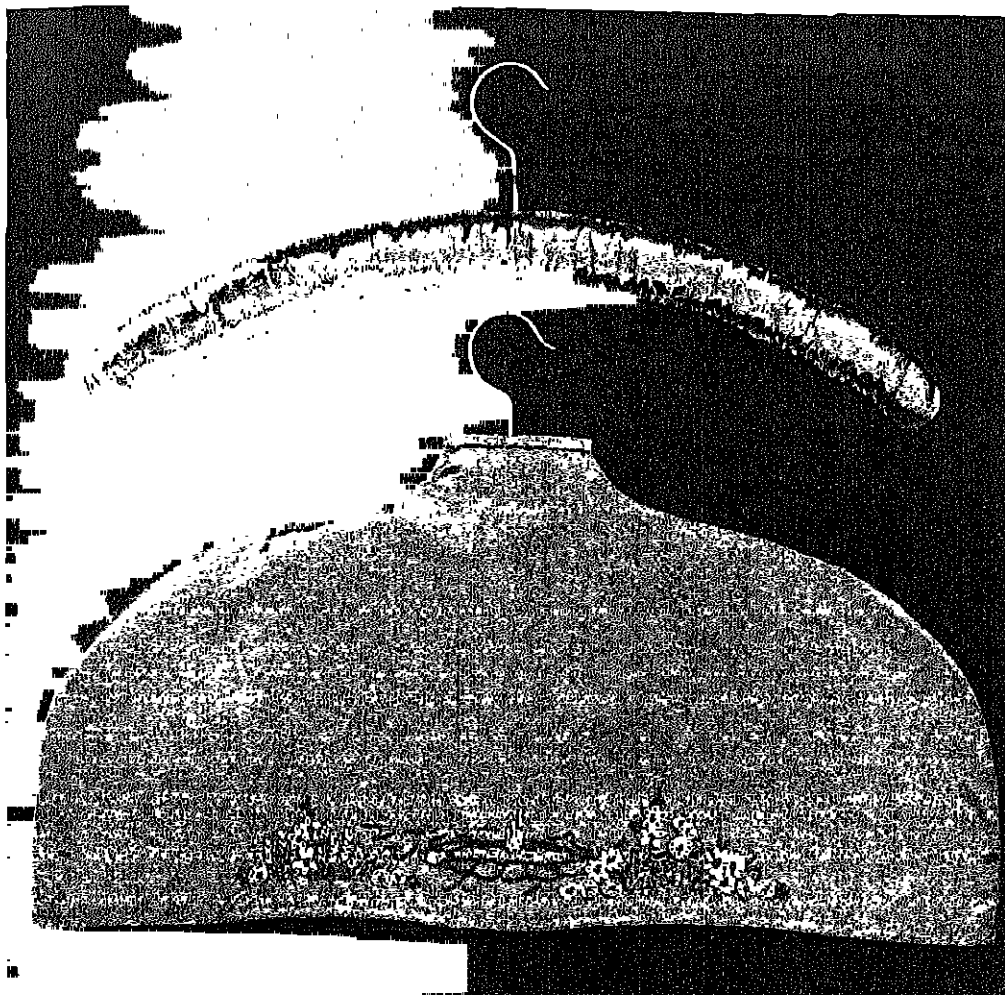


FIG. 2



DRESS HANGER AND COVER

6. Turn a hem along the bottom edge on the wrong side, and machine it.

7. On the front of the cover embroider a design such as is suggested in Fig. 3. If preferred, hems may be turned on all edges on the right side of the material and held in position with a decorative border, the sides being joined afterwards with decorative stitchery.

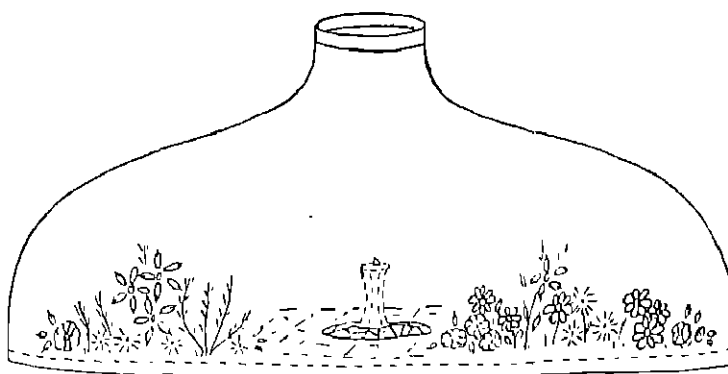


FIG. 3

GARDENING APRON

Teacher's requirements.—A piece of hessian or crash; coloured wools; needle; thimble; scissors; pins; patterns; drafting paper; pencil; ruler; designs suitable for decorating the Apron displayed on a chart; completed Apron.

Children's requirements.—A piece of crash; coloured embroidery wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler.

The pattern.—

1. Draw an oblong ABCD, AB = 14 in. BC = 35 in.; BE = $4\frac{1}{2}$ in.; AF = $9\frac{1}{2}$ in.; FG = $2\frac{1}{2}$ in. Join EG with a curved line. Join GD with a straight line. DH = 2 in. Join CH with a curved line, Fig. 1. Cut out on the pattern lines.

2. Draw an oblong PQRS, PQ = 8 in. QR = 10 in.; QT = $6\frac{3}{4}$ in.; SV = $\frac{3}{4}$ in. Join TV. Join RV with a curved line, Fig. 2. Cut out on the pattern lines.

3. For the neck strap draw an oblong, KLMN, KL = $4\frac{1}{2}$ in.; LM = 12 in.; LO = $1\frac{1}{2}$ in.; NX = 5 in.; NY = $2\frac{1}{4}$ in. Cut out on the pattern lines, Fig. 3.

4. For the strings draw an oblong 19 in. by $1\frac{1}{2}$ in.

Cutting out.—

1. Place the pattern for the Apron with BC to the fold of the material and cut out, allowing $\frac{1}{2}$ in. turnings on all edges.

2. Place the pattern for the pocket with QR to the fold and cut out allowing $\frac{1}{2}$ in. turnings.

3. Place the pattern for the neck strap with WO to the fold of the material and cut out, allowing $\frac{1}{2}$ in. turnings all round. (A join may be made at WO if desired.)

4. Cut out two strings, allowing $\frac{1}{2}$ in. turnings all round.

Making up.—

1. Turn a hem on all the edges of the Apron, the pocket, the neck strap and the strings on the right side of the material,

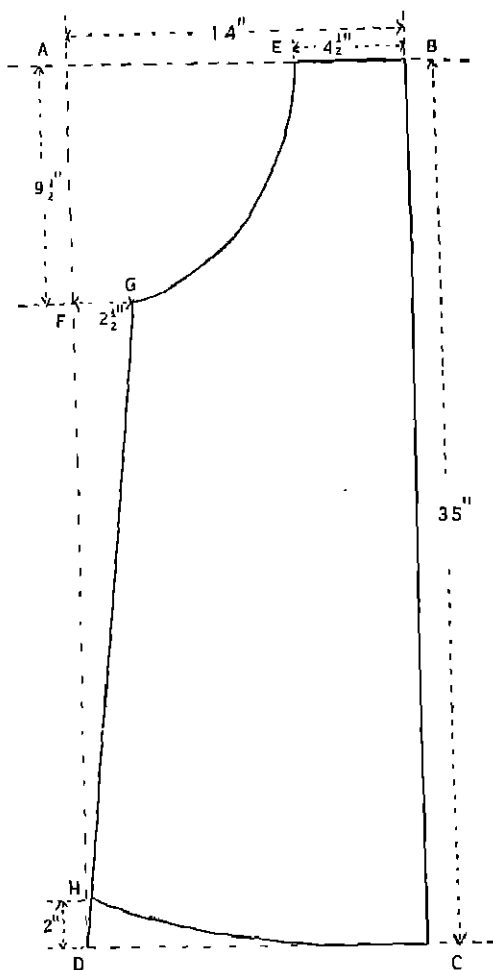


FIG. 1

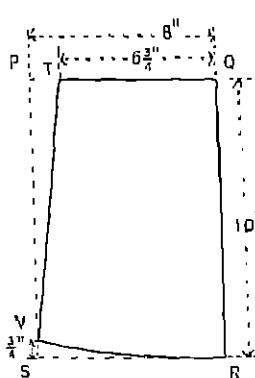


FIG. 2

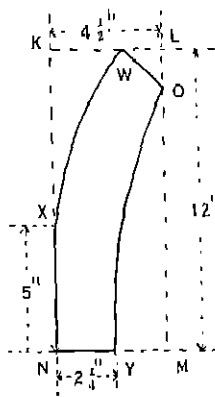


FIG. 3

and hold them in position with grouped blanket stitch as in Fig. 4, or with fancy blanket stitch and French knots as in Fig. 5.

2. Along the bottom of the Apron work a herbaceous border as suggested in Fig. 7, and on the pocket a design as in Fig. 8.

When working the herbaceous border the following stitches may be used:—

Flowers.—Daisy stitch; open daisy stitch; loop stitch; satin stitch (Fig. 6); lacking stitch.

Leaves.—Satin stitch; loop stitch.

Stems.—Stem stitch.

For the pockets the suggestions given below may be used to advantage:—

Flowers.—Daisy stitch; loop stitch.

Leaves.—Loop stitch.

Stems.—Stem stitch.

Girl and watering-can.—Stitching. If preferred, the sunbonnet, curls and bow of the dress may be filled in with satin stitch.

Crazy paving.—Stitching or tacking stitch.

Grass.—Tacking stitch.

3. Place the pocket in position on the Apron with the left corner 5 in. down from G and 5 in. in from the line GH. Attach it to the Apron with blanket stitching, and if desired divide it into two compartments with a line of decorative stitchery worked down the centre through the pocket and the Apron.

4. Place the strings and the neck strap in position and attach them to the Apron by means of two lines of sewing stitches worked in reverse directions, Fig. 9.

The style of the apron may be varied by the addition of two smaller pockets (placed one on each side of the apron) instead of one large pocket. The neck strap may be varied also by attaching two straps instead of one. Sew one end of each strap at opposite sides of the bib (E, in diagram), cross the straps, and sew the remaining ends at each side of the apron (G, in diagram).

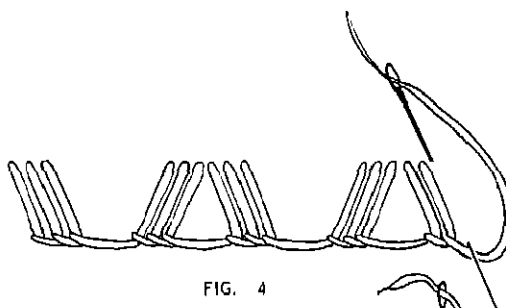


FIG. 4

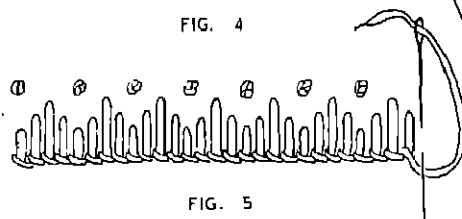


FIG. 5

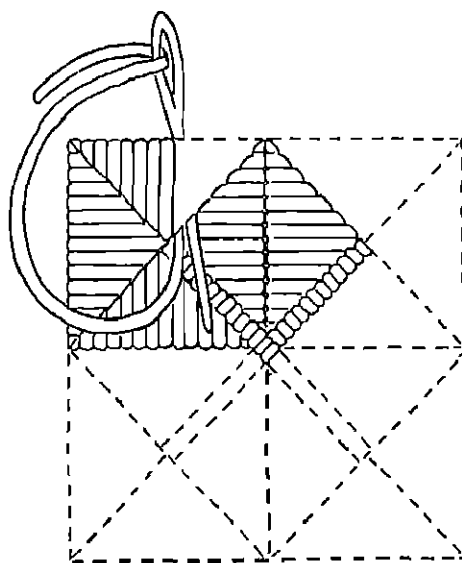


FIG. 6



FIG. 7

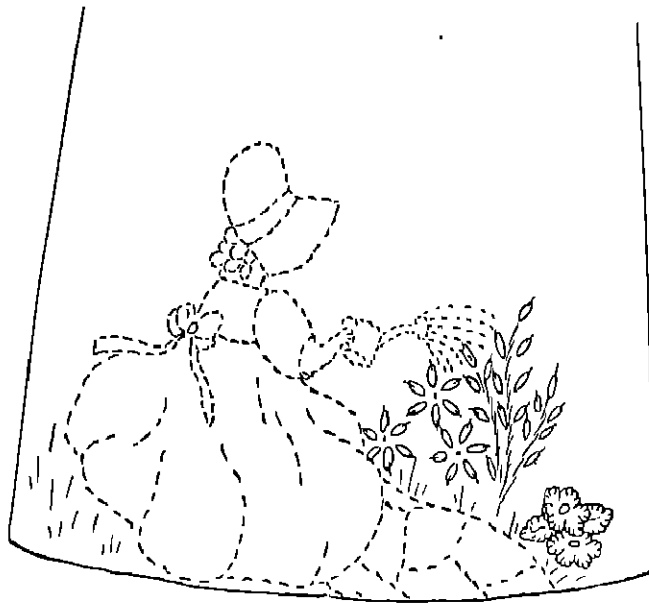


FIG. 8



FIG. 9

FELT SLIPPERS

Teacher's requirements.—A piece of crash; piece of material to represent lining; coloured wools; needle; scissors; thimble; pins; pair of slipper soles made in cardboard; patterns of the two styles; drafting paper; ruler; pencil; two kinds of Slippers; designs suitable for working on the Slippers shown on a blackboard or chart.

Children's requirements.—A piece of felt cloth; piece of flannelette for lining; embroidery wools; a pair of slipper soles; drafting paper; pencil; ruler; a small button mould.

STYLE 1

The pattern.—

1. Draw an oblong ABCD, $AB = 7\frac{1}{2}$ in. and $BC = 10\frac{3}{4}$ in. $AE = \frac{1}{2} AB$. F is $3\frac{1}{4}$ in. down from E. $AM = \frac{1}{2} AD$. $BN = \frac{1}{2} BC$. $DG = CH = 2\frac{1}{2}$ in. Join EM and EN with

curved lines. Join FG and FH with curved lines, Fig. 1. Cut out on the pattern lines.

Cutting out.—Lay the pattern on the felt cloth and again on the flannelette; cut out, allowing $\frac{1}{8}$ in. turnings on the outside edge (DEC) only.

Making up.—

1. On the front of each piece of felt, work an appliqué *motif* as suggested in Fig. 2. Cut out the sectors of the circle from scraps of felt cloth of another colour, and the triangular and oblong pieces from scraps of another colour of felt left over from the making of other felt articles.

2. Apply the *motif* to the Slipper, using one of the appliqué methods of stitching, and work the straight lines in stitching.

3. Sew up the back seam of each lining and the back seam of each felt Slipper, making them lie quite flat. Place the lining

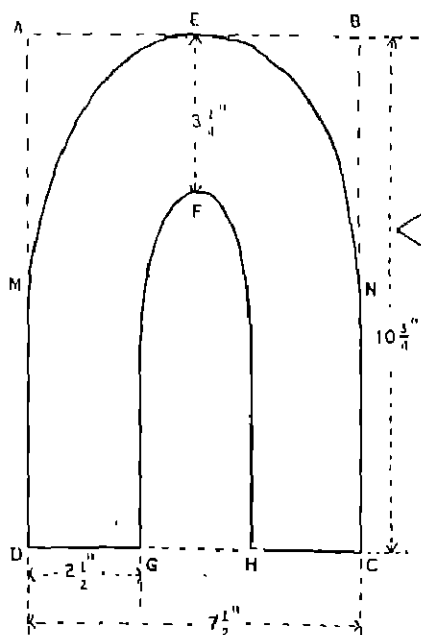


FIG. 1

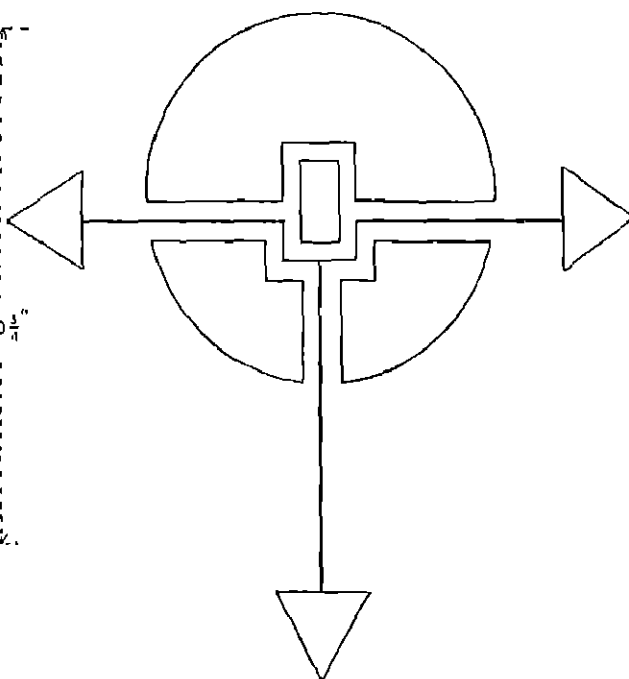


FIG. 2

to the inside of the felt, edge to edge, and tack them together.

4. Blanket-stitch the two together along the top edge, working two long and two short stitches alternately.

5. Round the toe place a running thread of small stitches through both materials. Draw it up slightly and ease in the fullness to fit round the toe of the slipper sole.

6. Join the lower edge of the Slipper to the sole with stitching, and remove all tacking stitches, Fig. 3.

The Slipper is drafted to fit a size 5 shoe sole and must be made larger or smaller according to the size required.

STYLE 2

The pattern.—

1. Draw an oblong ABCD, $AB = 8\frac{1}{4}$ in. $BC = 6\frac{1}{2}$ in. $DE = \frac{1}{2} DC$; $EF = 2\frac{1}{2}$ in.; FG

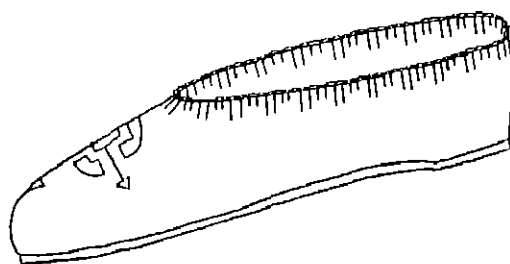


FIG. 3

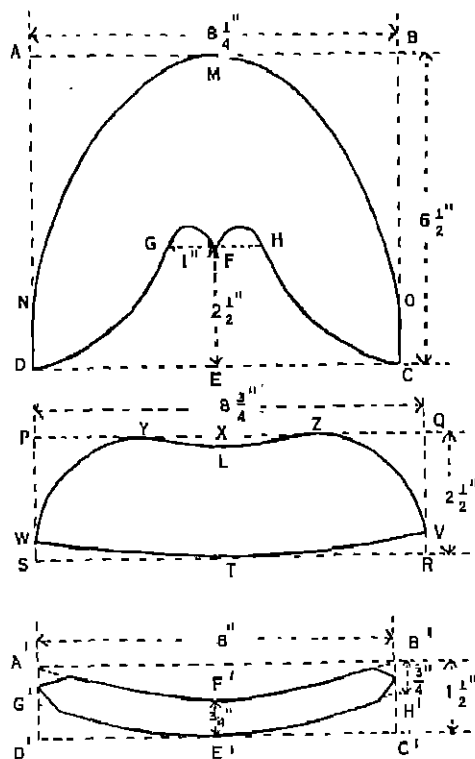


FIG. 4

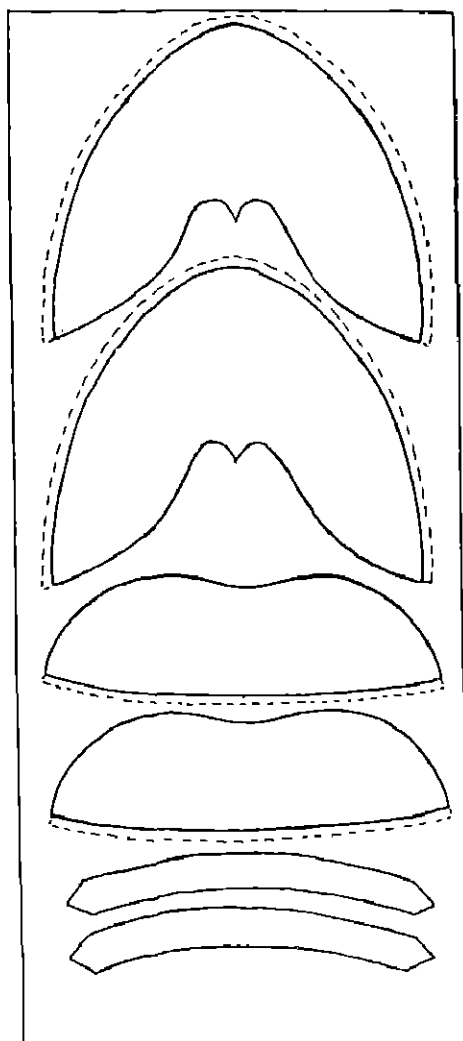


FIG. 5

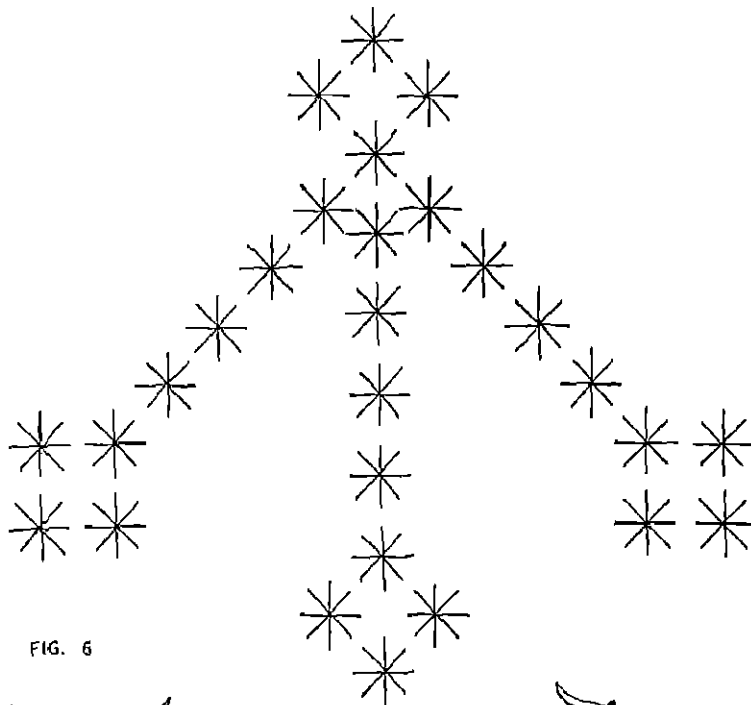


FIG. 6

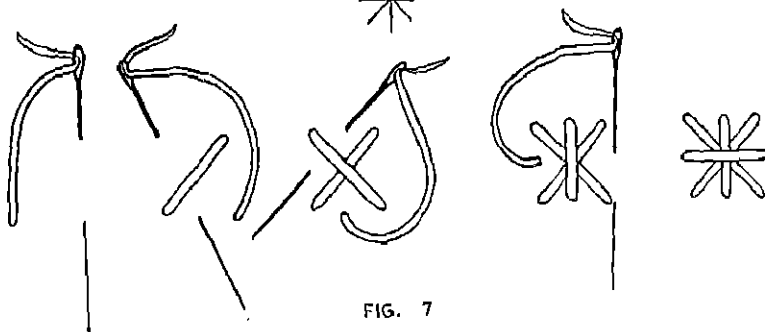


FIG. 7

= FH = 1 in. Join DGF and CHF as shown in Fig. 4. AM = $\frac{1}{2}$ AB; DN = CO = 1 in. Join NM and MO with a curved line as in Fig. 4. Cut out on the pattern lines for the front of the sandal.

2. Draw an oblong PQRS, PQ = $8\frac{1}{2}$ in. QR = $2\frac{1}{2}$ in. ST = $\frac{1}{2}$ RS. RV = SW = $\frac{3}{4}$ in. Join VW with a curved line passing through T, Fig. 4. PX = $\frac{1}{2}$ PQ; XL = $\frac{1}{8}$ in.; PY = QZ = $2\frac{1}{2}$ in. Join WYLZV as shown in Fig. 4 to obtain the pattern for the back part of the sandal and cut out on the pattern lines.

3. Draw an oblong A'B'C'D', A'B' = 8 in. and B'C' = $1\frac{1}{2}$ in. D'E = $\frac{1}{2}$ C'D'; E'F

= $\frac{3}{4}$ in.; A'G = B'H' = $\frac{3}{4}$ in. Draw in the pattern for the strap as in Fig. 4. Mitre each end. Cut out on the pattern lines.

Cutting out.—

1. Lay the patterns on the felt cloth and lining as shown in Fig. 5 and cut out, allowing $\frac{1}{8}$ in. turnings where indicated.

Making up.—

1. On the front of each felt portion draw a design as in Fig. 6, and work with the wools in double cross stitch as shown in Fig. 7.

2. Lay the linings to the inside of the corresponding felt pieces, and tack.

3. Machine the lining and the felt together along the top edge of the front and back portions with a double row of machine stitching, one close to the edge and the other $\frac{1}{4}$ in. away from the edge.

4. Between the rows of machining work a line of double cross stitches.

5. Machine each strap with a double row of machining on all edges and work the pattern stitchery, if desired, or leave it plain.

6. Join the back portion to the sole with stitching.

7. Place a gathering thread along the lower edge of the front portion, ease the fullness round the toe, and join to the sole with stitching, overwrapping the back portion slightly at each side, Fig. 8.

8. Place the strap in position and attach one end to the inside of the sandal on the back portion with double cross stitch.

9. At the opposite end of each strap work a buttonhole.

10. Cover a button mould with felt cloth and stitch it on to the back portion to correspond with the buttonhole, Fig. 8.

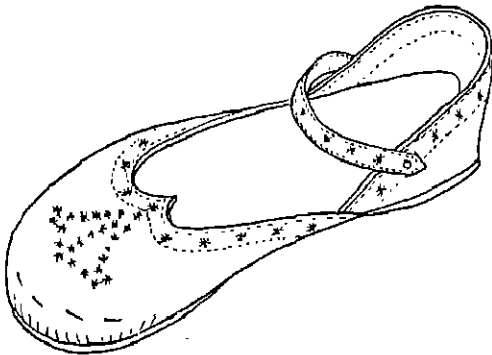


FIG. 8

PIN CUSHION

Teacher's requirements.—A piece of crash; coloured wools; piece of material for making a pad; some bran; needle; scissors; thimble; pins; pattern; drafting paper; pencil; ruler;

compass; completed Pin Cushion; chart showing suggested designs.

Children's requirements.—A piece of pastel-coloured linen or other suitable material; piece of linnene; some bran; needle; scissors; pins; thimble; drafting paper; pencil; ruler; compass.

The pattern.—

1. Draw a circle with diameter 6 in. and divide the circumference into six equal parts. Bisect each of these arcs and draw the diameters.

2. Using the same centre, draw a smaller circle with diameter 4 in., and complete the pattern as in Fig. 1. Cut out.

3. Draw and cut out a circle with diameter $3\frac{1}{2}$ in.

Cutting out.—

1. Lay the pattern on the material 1 in. away from the edges, and mark all round it with a sharp pencil to keep it a good shape. Cut the traced part away from the remainder of the material, leaving 1 in. of material outside the pattern line.

2. Mark round the pattern again in the same way and cut away the traced portion.

3. Lay the 3 in. circular pattern on the linnene and cut out two circles, allowing $\frac{1}{4}$ in. turnings all round.

Making up.—

1. Join the two circular pieces of linnene on the wrong side of the material with machining, leaving an opening of about 2 in.

2. Turn inside out, fill with bran, turn in the turnings and sew them together. This forms the cushion.

3. On each scalloped piece draw the inside lines for the working of the scallops, and work them with close loop stitches.

4. In each of the points of one circular piece work a small floral design as suggested in Fig. 2. Work an eyelet hole for the centre, and two open daisy stitches, one above the other, for the petals. Tack the cushion in the centre on the wrong side of the material, Fig. 3.

5. In each of the points of the second scalloped piece work an eyelet hole only.

6. Place the two scalloped pieces together with the points alternating and the pad lying between. Tack the two together just on the outside of the pad, Fig. 3.

7. To hold the cushion in position, work a line of border stitchery between the cushion and the beginning of the scallops.

8. Make a cord of twisted embroidery silks and attach it to the back of the cushion in the form of a loop, Fig. 4.

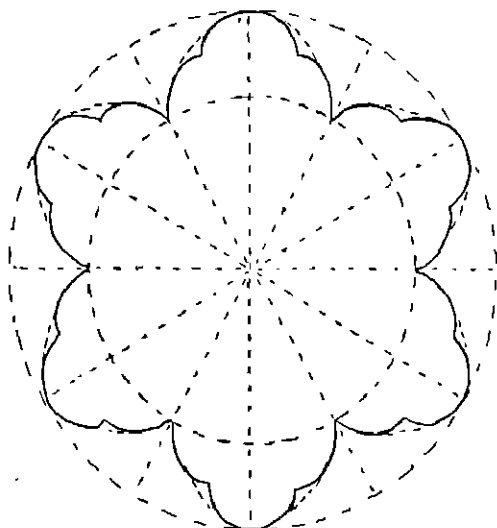


FIG. 1

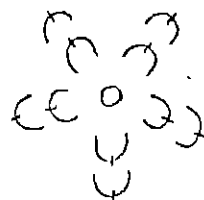


FIG. 2

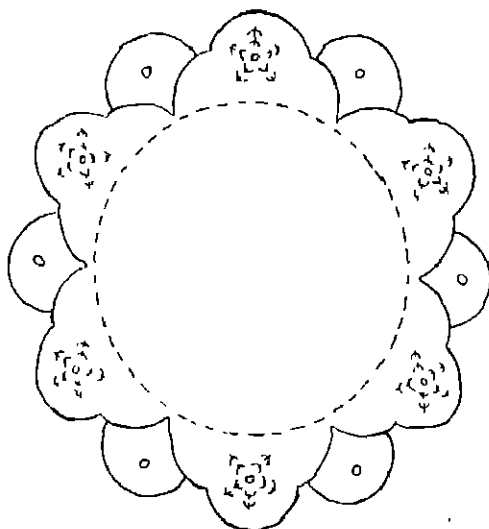


FIG. 3

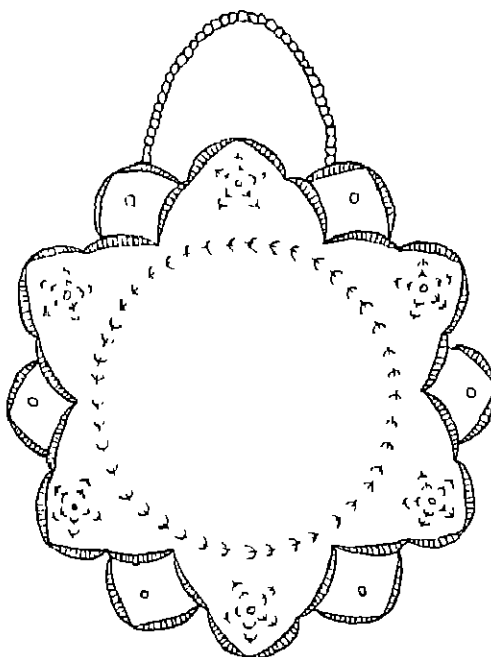


FIG. 4

DOYLEY CASE

Teacher's requirements.—A piece of crash; coloured wools; needle; scissors; thimble; pins; pattern; suggested designs displayed on a chart; completed Doyley Case; compass; drafting paper; pencil; ruler.

Children's requirements.—A piece of pastel-coloured linen; coloured embroidery silks; drafting paper; pencil; ruler; compass; needle; scissors; thimble; pins.

STYLE 1

The pattern.—Draw a circle with diameter 10 in. This is large enough to take a 9 in. doyley, and will vary in size according to the size of the doyley for which it has to be used.

Cutting out.—Lay the pattern on the material and cut out two circles allowing $\frac{1}{2}$ in. turnings all round.

Making up.—

1. Over the pattern line work groups of nine loop stitches of varying sizes, beginning with a small stitch, increasing in size until the fifth stitch is reached, then decreasing to the ninth stitch, Fig. 2.

2. Cut away the turnings close to the blanket-stitched edge.

3. On each circle draw a design as suggested in Fig. 2, and work the flowers as shown in Figs. 1A, 1B and 1C. Fig. 1A shows one flower being worked in blanket stitch with another line of blanket stitches worked in the loops of the previous row in a contrasting or harmonising shade of silk. The flower shown in Fig. 1B consists of lazy daisy stitches of different sizes, the centre being filled in with French knots. Fig. 1C shows the flower worked in daisy stitches of equal size, with an open daisy stitch worked between the petals in a different colour and French knots worked in the centre.

4. Work the stems in stem stitch.

5. Make two cords of twisted embroidery silks.

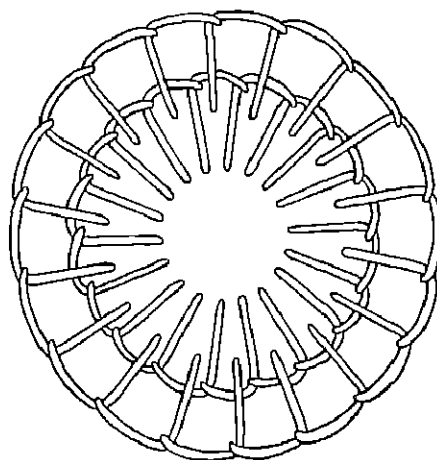


FIG. 1 A

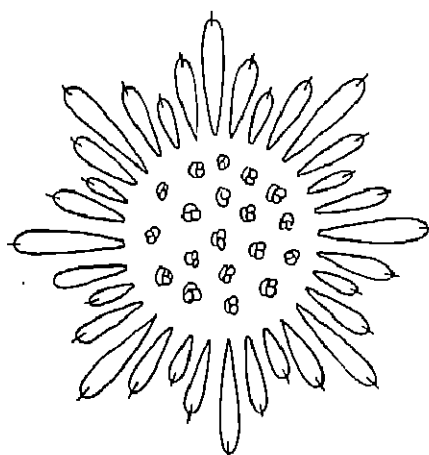


FIG. 1 B

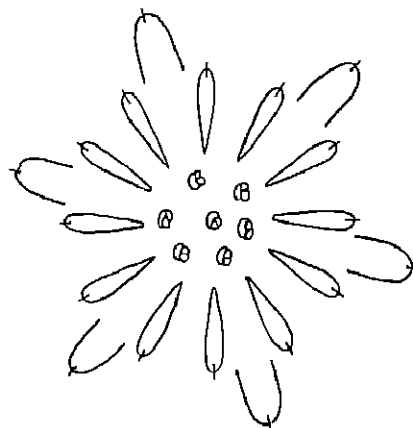


FIG. 1 C

6. Place the two circles together with the wrong sides facing; make an eyelet hole in each circular piece near the edge; insert one of the cords and tie in a bow.

7. Across the diameter from these eyelet holes make another eyelet hole in each piece; insert the other cord and tie in a bow, Fig. 2.

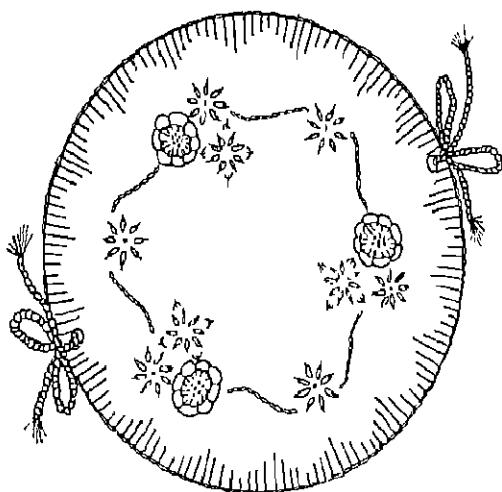


FIG. 2

STYLE 2

The pattern.—

1. Draw a circle with diameter 10 in.
2. Divide the circumference into six equal parts, and divide each sixth part into three equal parts.
3. Scallop the edge as shown in Fig. 3.

Cutting out.—

1. Lay the pattern on the material and mark round the pattern lines. Cut out, leaving 1 in. turnings all round.
2. Mark the inside lines of the scallops.
3. Cut another piece and mark it in exactly the same way.

Making up.—

1. Work the scalloped edge with padded blanket stitch.
2. Draw a design on each piece as shown in Fig. 4.

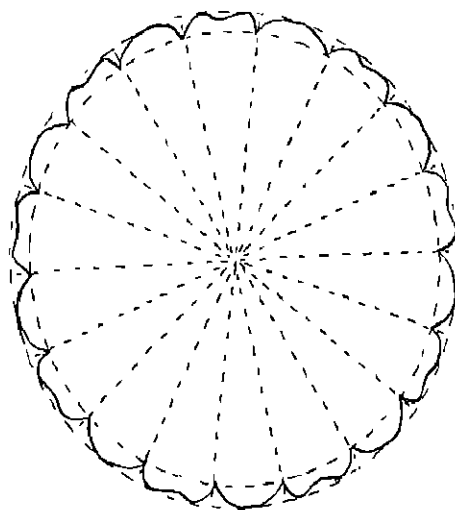


FIG. 3

3. Work the stems in stem stitch, the leaves and flowers in raised satin stitch and the connecting lines in eyelet holes.

4. Cut away the surplus material round the scalloped edge.

5. Place both circles together with the wrong sides facing and sew them together along one of the "square" scallops.

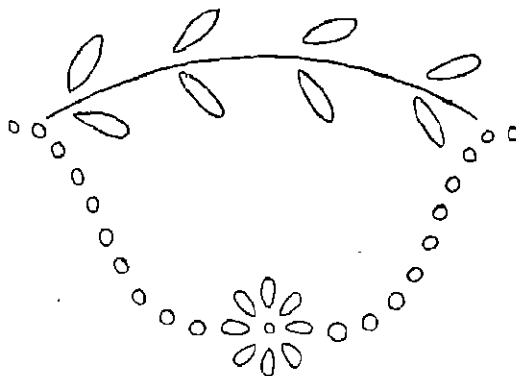


FIG. 4

6. Across the diameter from this point make an eyelet hole in each circular piece, through which a piece of ribbon or cord is inserted and tied in a bow, Fig. 5.

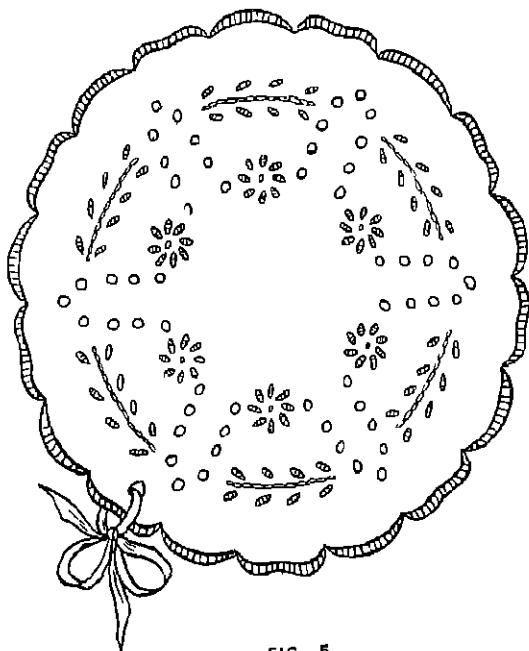


FIG. 5

MAID'S AFTERNOON APRON

Teacher's requirements.—A piece of hessian; coloured wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler; patterns; chart illustrating processes and suitable decorative stitchery; completed Apron.

Children's requirements.—A piece of white lawn, cambric, or nainsook; white embroidery cottons; needle; scissors; thimble; pins; drafting paper; pencil; ruler.

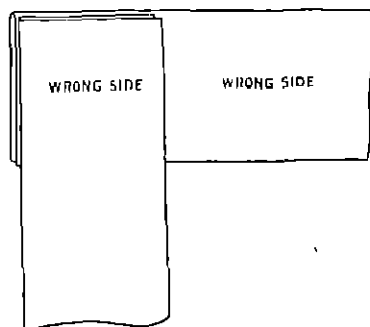


FIG. 1

The pattern.—Draw and cut out oblongs as follows:—

1. 23 in. by 17 in. for the apron.
2. 3 in. by 5 in. for the bib.
3. 26 in. by 3 in. for the strings.
4. 14 in. by 2 in. for the bands.
5. 19½ in. by 3 in.; 26½ in. by 3 in.; 6½ in. by 3 in.; 7½ in. by 3 in. for the borders.

Cutting out.—Lay the patterns on the material and cut out, allowing ½ in. turnings on all edges of the Apron, bib, strings and bands, and on the long edges only of the borders.

Making up.

1. Turn a narrow hem on the wrong side of the material on the two short sides and one long side of the apron, and along the two long sides and one short side of the bib, and tack them in position.

2. Join the three strips for the border round the apron, having the longest strip lying between the two short ones. These are joined to represent mitred corners so that they will fit perfectly flat round the three sides of the apron. The joins are worked in the following manner:—

Fold the strips lengthways in two equal parts, having the wrong side outside, and press the folds flat. Place the end of one strip over the end of a second strip as in Fig. 1. Where the two ends overlap, fold back the ends along the diagonal and crease the fold well, Fig. 2. Allow ½ in. turnings along each diagonal and cut away the surplus corners, Fig. 2. Open out the strips,

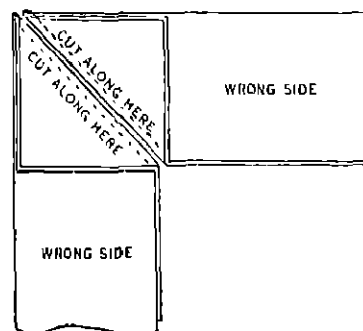


FIG. 2

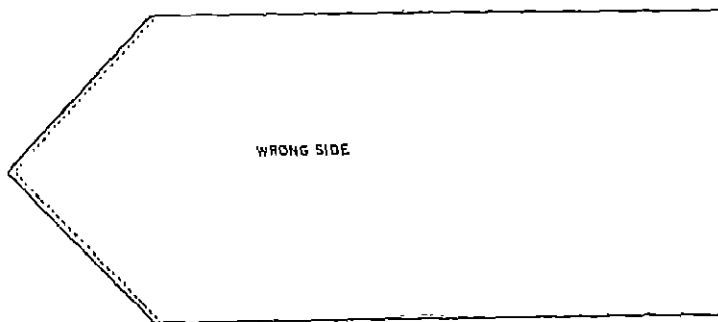


FIG. 3

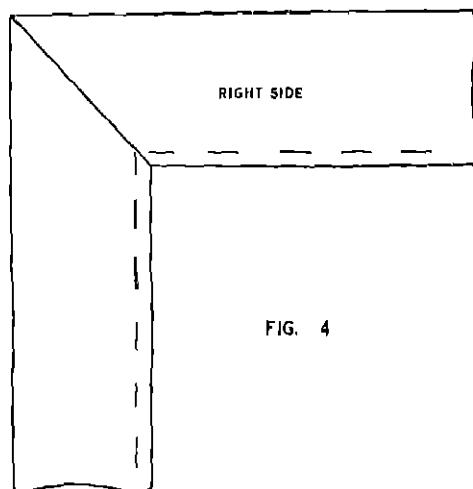


FIG. 4

place the ends together with the right sides facing, and stitch firmly along the turnings, taking care at the points where the turnings are very small, Fig. 3. Press the turnings open flat. Turn the material so that the right side is now uppermost, fold the strips lengthways in two and form the mitred corners as in Fig. 4.

3. Turn in the raw edges of the border to face each other and tack the two folded edges together, Fig. 4.

4. Join the strips for the border of the bib in the same manner, having the short length between the two long ones.

5. Place a strip of drafting paper 1 in. wide along the edge of the apron on the wrong side and tack the hem of the apron to the paper.

6. Place the strip for the border along the paper, so that the inside edge of the border lies $\frac{1}{4}$ in. away from the hem of the apron, and the mitred corners fall in line with the corners of the apron, Fig. 5.

7. Join the border to the apron, using the white embroidery cotton and working the herring-bone stitch as an insertion stitch, Fig. 5. In working the stitch the needle passes through the fold of the hem of the apron and through the double fold

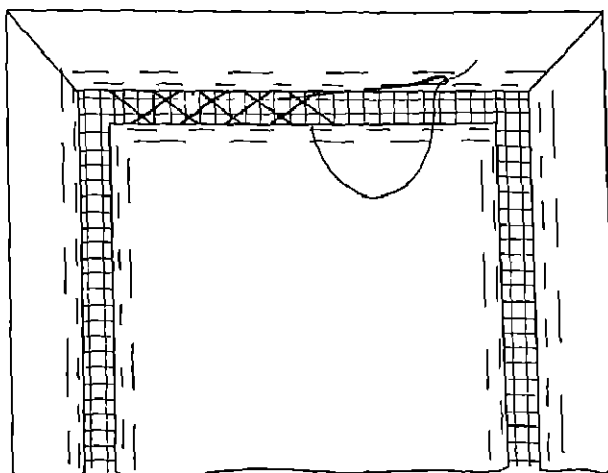


FIG. 5

of the border. Block faggoting may be used as the insertion stitch if preferred, Fig. 6.

8. Remove the paper and work an open daisy stitch in the spaces between the herring-bone stitches on both the apron and the border, Fig. 7. These stitches hold the hem in position round the apron.

9. Attach the border to the bib in the same way.

10. In the centre of the bib and in each bottom corner of the apron, work a *motif* built up from tacking stitches and open loop stitches. Work the *motif* as follows:—

With a pencil mark lightly round a penny, and in the centre of the circle thus formed mark round a threepenny piece. From the circumference of the inner circle work sixteen tacking stitches to the circumference of the larger circle, Fig. 8. In the spaces between the tacking stitches work open daisy stitches, Fig. 9. Work a second row of open loop stitches round the first row, Fig. 10. Complete the *motif* with a few French knots in the centre, Fig. 10.

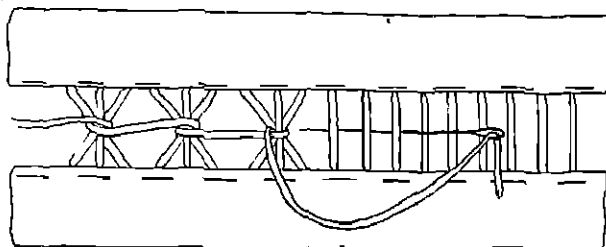


FIG. 6

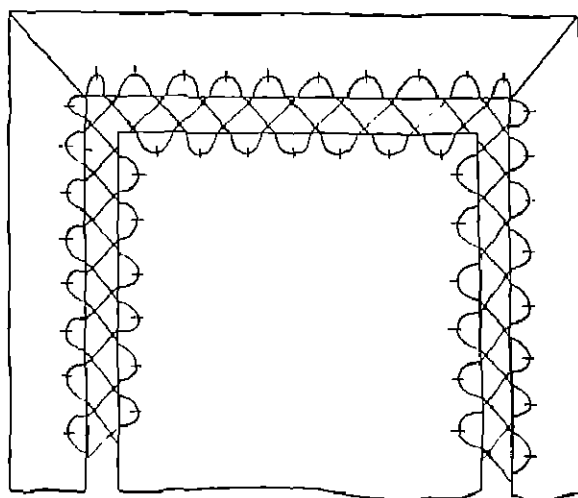


FIG. 7

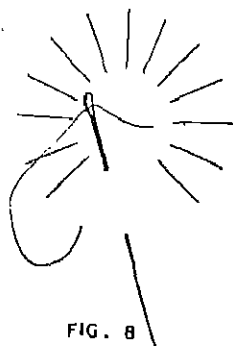


FIG. 8

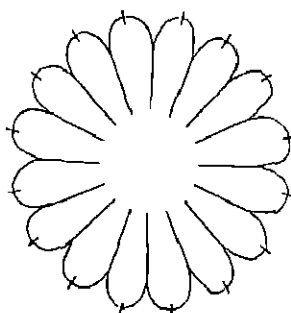


FIG. 9

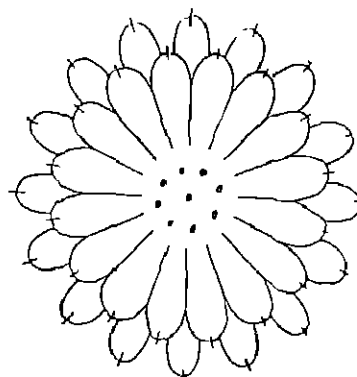


FIG. 10

11. Divide the upper edge of the apron into two equal parts and tack-mark the centre.

12. Tack-mark the centre of one of the long edges of one of the band portions.

13. Pleat each half of the apron to fit each half of the band. Half the apron is 13 in. and half the band is 7 in. (not including the $\frac{1}{2}$ in. turnings at the end), so that 6 in. are left to form two-thirds of the pleats. These may be arranged to form two $1\frac{1}{2}$ in. pleats or four $\frac{3}{4}$ in. pleats facing away from, and lying 2 in. away from, the centre front.

14. Place the long edge of the band to the top pleated edge of the apron having the right side of the band to the wrong side of

the apron. The centre tack marks should fall together.

15. Machine the two together, raise the band, and tack it flat to the turnings of the join.

16. Tack-mark the centre of the raw edge of the bib; lay this edge to the second long edge of the band, so that the tack marks fall together, with the wrong side of the bib to the right side of the band, and machine the edges together.

17. Raise the bib and tack the turnings down flat to the inside of the band.

18. Fold down and tack the remainder of the turnings of the long edge.

19. Machine-stitch hems along the two

long sides and one short side of each string. Place the raw edge of each string to each short edge of the band, having the wrong side of the string to the right side of the band; machine the two edges together, and tack the turnings flat to the inside of the band.

20. Fold under and tack the turnings of the second portion of the band. Place it over the first portion of the band, wrong side to wrong side, and machine the band in position on all edges, Fig. 11.

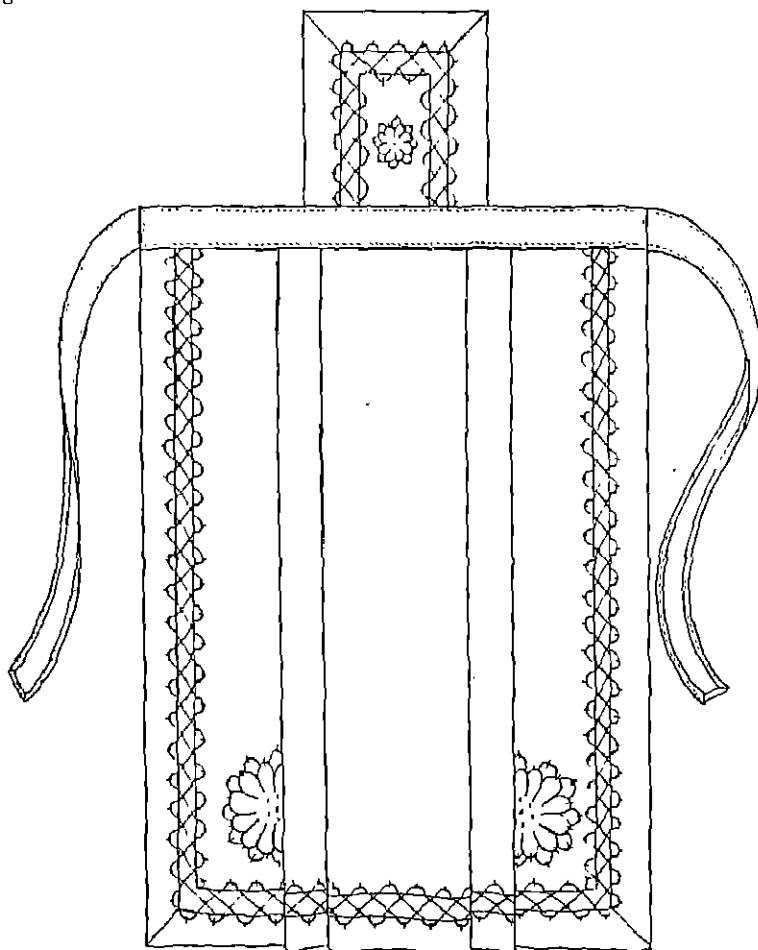
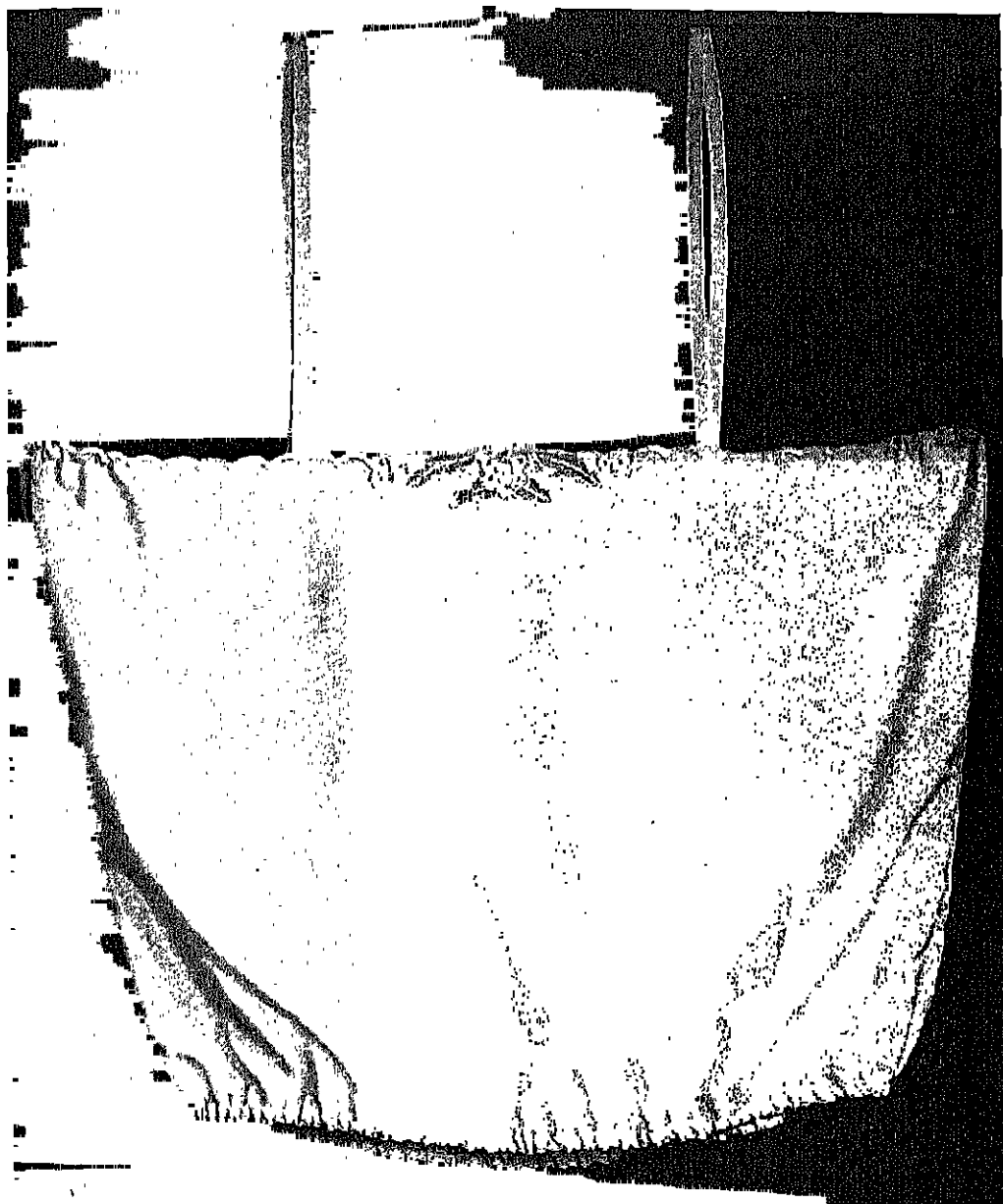


FIG. 11



CAMISOLE

CAMISOLE AND MODESTY VEST

Teacher's requirements.—A piece of hessian; coloured wools; needle; thimble; scissors; pins; piece of canvas to represent net; a piece of drafting paper; pencil; ruler;

designs suitable for decorating the article displayed on a chart; elastic.

Children's requirements.—A piece of crêpe de chine or fine artificial silk; embroidery silks; needle with a very big eye; a fine

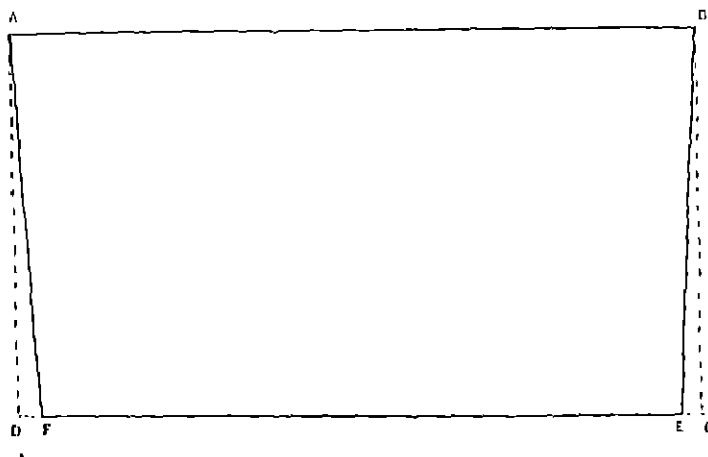


FIG. 1

embroidery needle; piece of fine net; drafting paper; pencil; pins; narrow elastic; thimble; scissors.

The pattern.—Draw an oblong ABCD, $AB = \frac{1}{2}$ bust measurement + $\frac{1}{2}$ in.; $BC =$ under-arm measurement. $CE = DF = \frac{1}{2}$ in. Join AF and BE with a slightly curved line. Cut out through the points ABET, Fig. 1.

If the Camisole is to wear with a jumper, then BC and AD are continued to 3 or 4 in. past the waist, the lines afterwards being curved in to the waist for $\frac{1}{2}$ in. In this case elastic is not inserted.

Cutting out.—Cut out two pieces like the pattern, allowing $\frac{3}{4}$ in. turnings on the top and bottom edges and $\frac{1}{2}$ in. turnings on the side edges.

Making up.—

1. Join the two pieces together down the sides with a French seam.
2. Machine a hem along the bottom edge; i.e., FE.
3. Make a buttonhole on the under-side of the hem only, through which the elastic is inserted later.
4. The top edge may be finished in a variety of ways; e.g., (1) a scalloped edge with a decorative design worked immediately below it; (2) a scalloped edge with decorative

stitchery worked in the centre front only (3) a hem-stitched edge with an embroidered centre front.

Figs. 2 and 3 suggest designs for carrying out the first method. Work the sprays in blanket stitching, stem stitch and satin stitch.

Fig. 4 shows a design suitable for carrying out Method 2. The design may be traced just under the scalloped edge, or the edge of the design may be used to form part of the scalloped edge itself. This design looks most effective when "inlaid" with net. Tack a double piece of net in position under the design on the wrong side of the material. Work all the edges in very fine blanket stitches which pass through the net and the material. Work eyelet holes in all the petals of the flowers, and outline the stems in stem stitch or blanket stitching. With a sharp pair of scissors, cut away carefully the material from the leaves and the centre of the flowers, thus exposing the net. Along the centre of each leaf work a vein in very fine chain stitch. Cut away the surplus net underneath, following the design all the way.

Fig. 5 illustrates the third method. When working the hem-stitched edge, there is no necessity to draw the threads if a needle with a very large eye is used. When working the stitch as for hem stitching with drawn

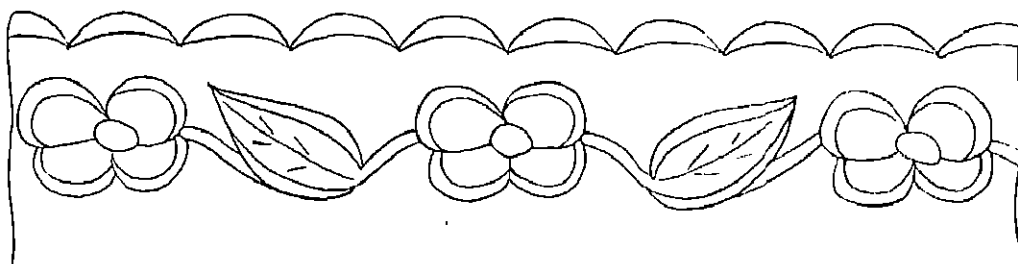


FIG. 2

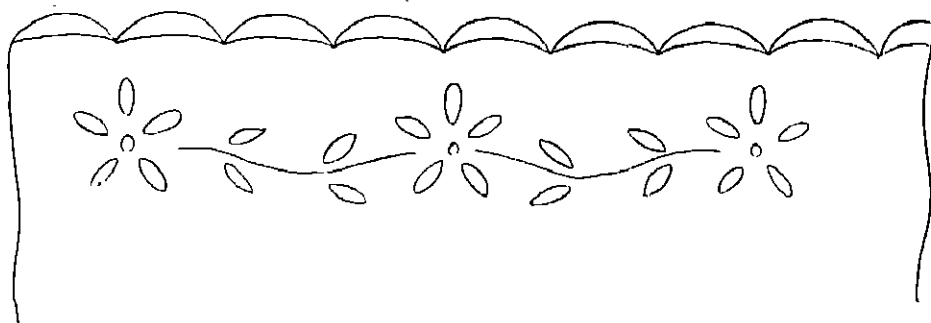


FIG. 3

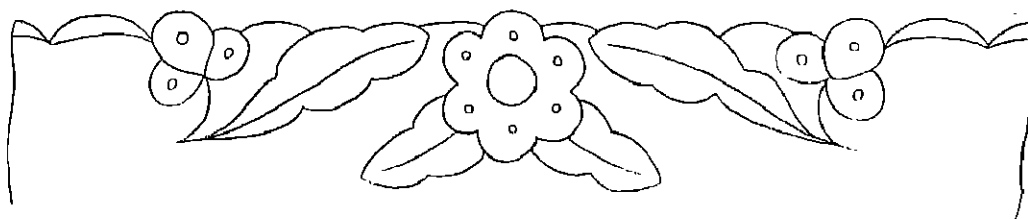


FIG. 4

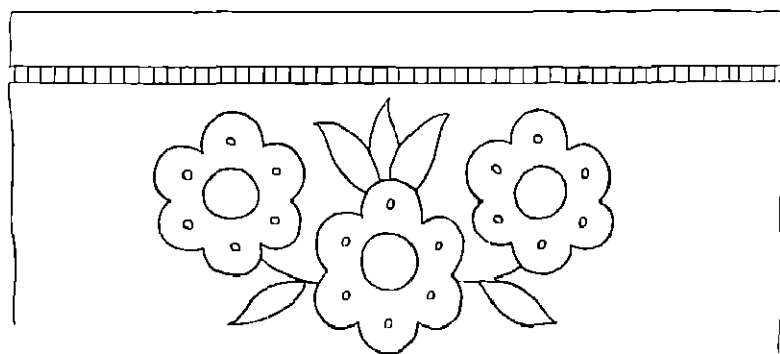


FIG. 5.

threads, the large eye forms a hole in the material, and if the thread is drawn up tightly a hem-stitched appearance is the result. The design is "inlaid" with net as in Method 2.

5. Measure about 4 in. on each side of the centre front and the centre back to find the positions of the shoulder straps. Make very narrow straps of the same material as the Camisole, cut to the required length, and attach them at these points. If preferred, narrow ribbon may be used for the straps.

6. Cut a piece of elastic to fit the waist and insert through the hem along the lower edge of the Camisole.

7. Cut two pieces of elastic 4 in. in length. Place one on each side of the Camisole along the top edge and across the under-arm seam. Catch-stitch each in position, gathering up into it any superfluous material. If preferred, a slot for the elastic to be inserted may be made by the addition of a crossway band 5 in. in length, placed on the wrong side of the Camisole.

MODESTY VESTS

1. These articles are really the centre front portion of a Camisole, and are made from an oblong piece of material about 8 in. by 10 in. To avoid a bulky appearance under the dress, whip the side and bottom edges instead of neatening them with hems.

Work whipping as follows:—

Cut the edge of the material very clean and true to a thread, if possible, as it is rolled down and not folded. Fix the thread securely at the beginning, and roll a short length of the material (about 1 in.) between the thumb and forefinger of the left hand, by gently drawing the thumb upwards and downwards over the raw edge. The roll must be as fine and tight as possible. Pass the needle through the single material from the right side to the wrong side immediately under the roll. When bringing it through, slant the needle from right to left, Fig. 6.

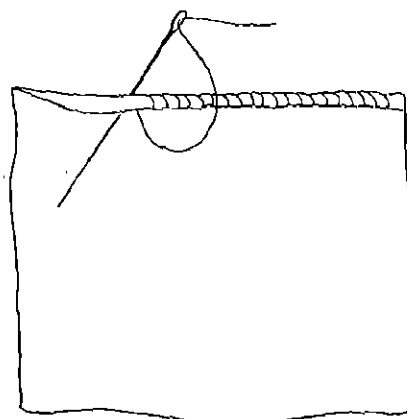


FIG. 6

2. Neaten the top edge in the same manner as for a Camisole or by means of rouleau work, Figs. 7 and 8.

COLLAR AND CUFFS

Teacher's requirements.—A piece of hessian; coloured wools; needle; scissors; thimble; pins; drafting paper; pencil; patterns; suitable decorative stitchery shown on a chart; completed sets of Collar and Cuffs.

Children's requirements.—A piece of organdie or silk material; embroidery silks; needle; scissors; thimble; pins; drafting paper; pencil.

The pattern.—From the bodice and the cuff drafts make the pattern of the Collar and Cuffs as shown in Fig. 1.

Cutting out.—

1. Cut out the Collar and Cuffs in single material, allowing $\frac{1}{4}$ in. turnings along the neck and wrist edges, and $\frac{3}{4}$ in. turnings on the remaining edges.

2. Cut crossway strips of the same material $\frac{3}{4}$ in. wide to fit round the neck and wrist edges.

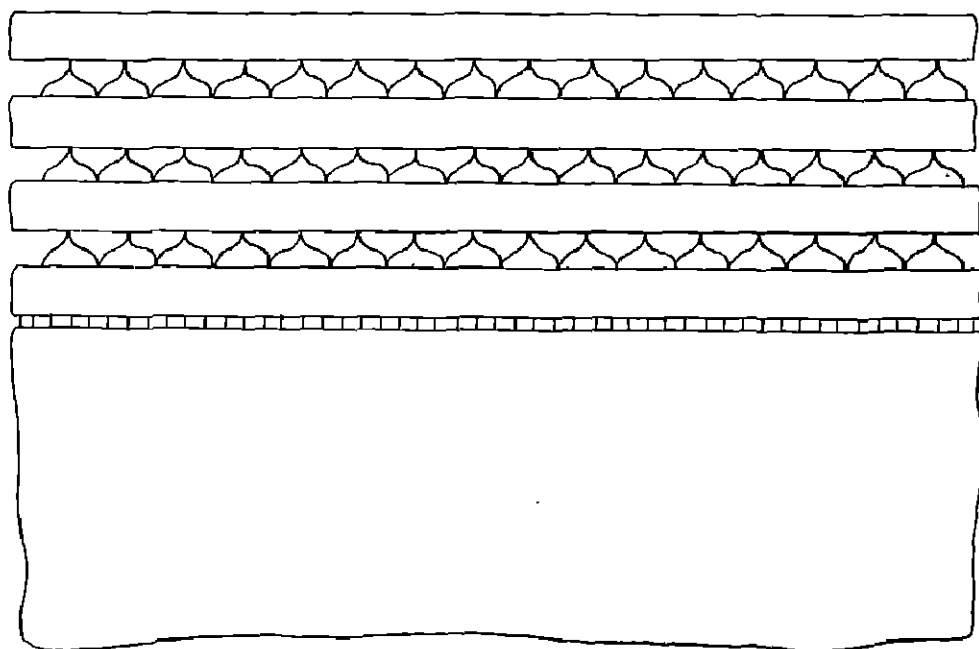


FIG. 7

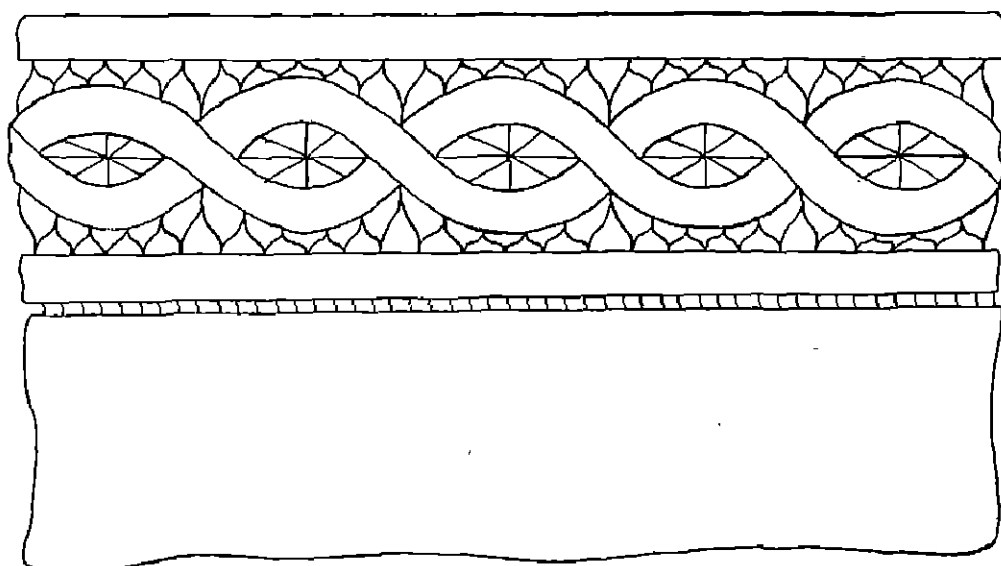
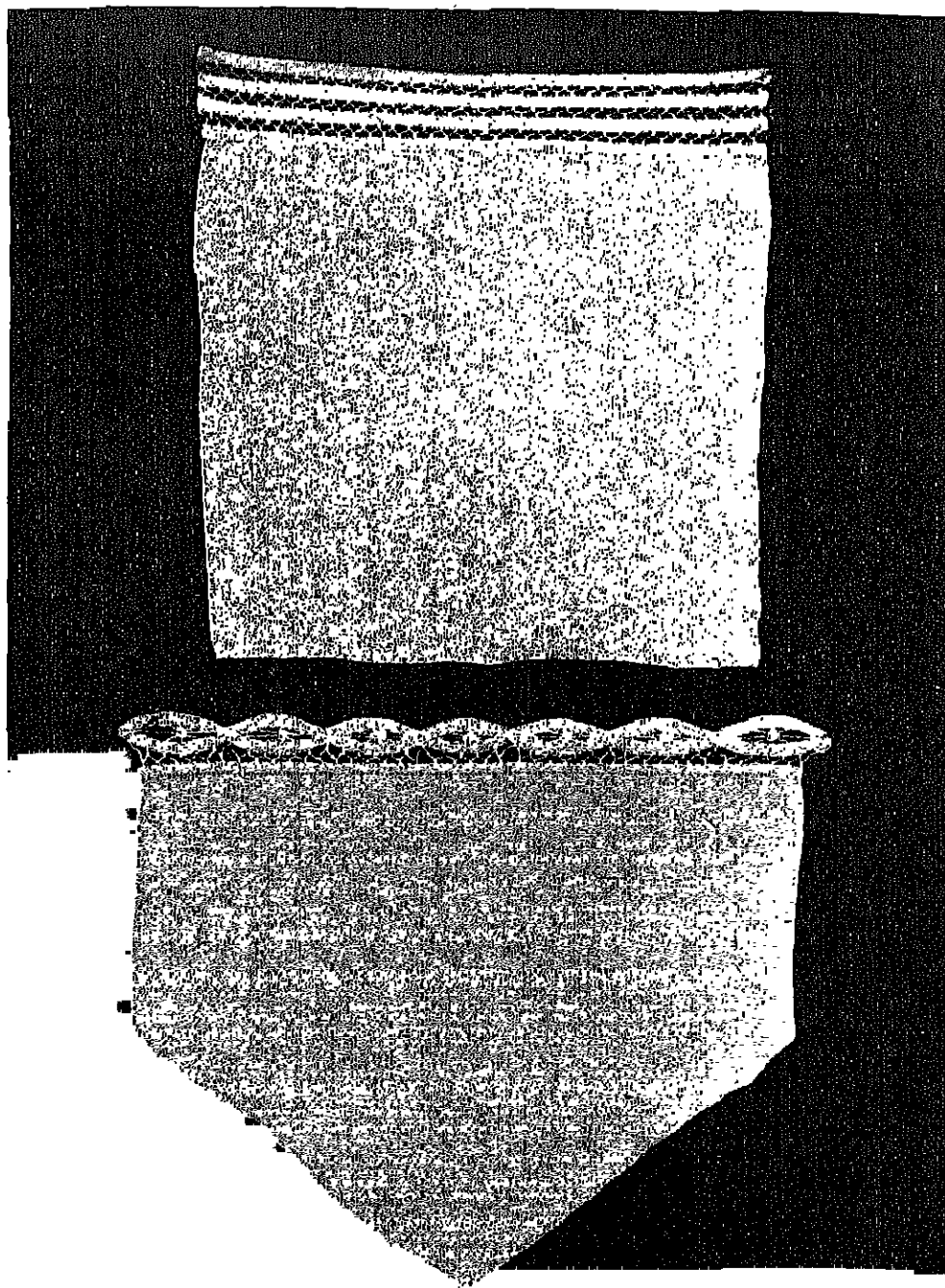


FIG. 8



MODESTY VESTS

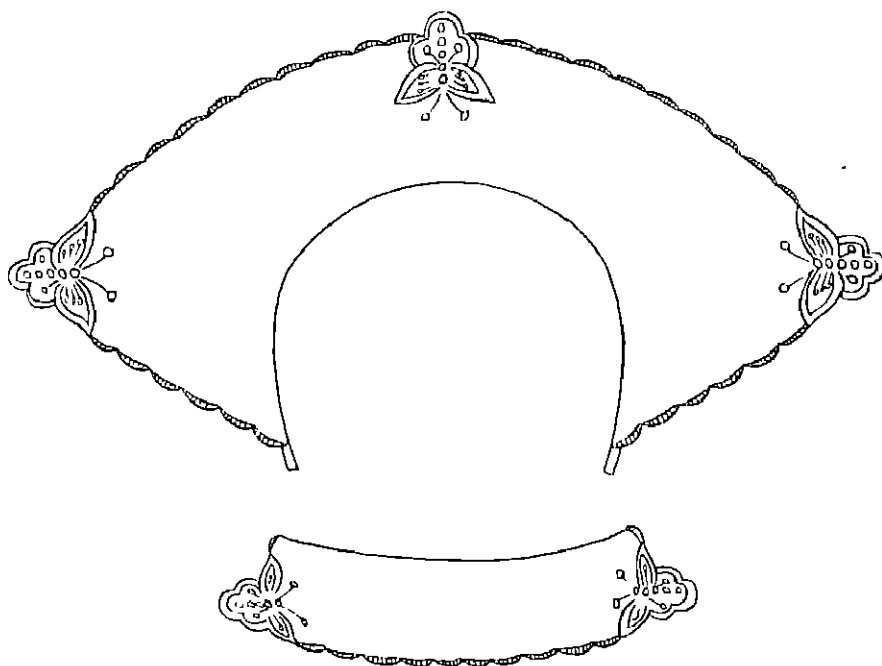


FIG. 1

Making up.—

1. Scallop the edge as shown in Fig. 1.
2. Trace designs such as those suggested in Fig. 1 in each corner and in the centre back of the collar. These may be worked in raised satin stitch and eyelet holes.
3. Fig. 2 shows another set consisting of a double Collar which starts from just behind the shoulder line, and double Cuffs. These look most effective when carried out in organdie. Faggot a narrow strip of the same material along all edges except the neck and wrist edges. Embroider a small floral design in each corner or work a border of fine cross stitching.

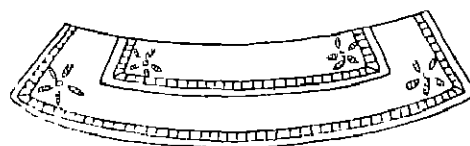
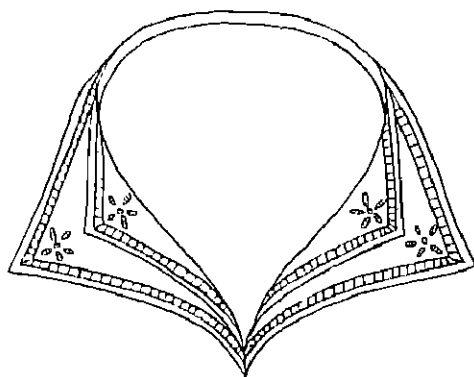


FIG. 2

NAPKIN CASE AND NAPKINS

¹ **Teacher's requirements.**—A piece of hessian; coloured wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler;

a pattern; a completed Napkin Case and two or three Napkins; a chart illustrating suitable designs and monograms.

Children's requirements.—A piece of linen; embroidery silks; needle; thimble; scissors; pins; drafting paper; pencil; ruler.

The pattern.—Draw a square with side 6 in. On each side of the square construct an oblong $5\frac{1}{2}$ in. wide. $AC = \frac{1}{2} AB$; $AD = BE = 1\frac{1}{2}$ in. Join CD and CE with straight lines, complete as in Fig. 1, and cut out on the scalloped lines.

Cutting out.—

1. Place the pattern on the material so that $\frac{1}{2}$ in. turnings are allowed all round, and mark round the pattern lines.

2. Cut away the remainder of the material and mark the inside lines of the scallops.

Making up.—

1. Work the scalloped edge with a heavily padded blanket stitch.

2. Draw on one of the oblongs (which forms the "lid") the pattern shown in Fig. 2. Work the flowers and leaves in raised satin stitch and the dots as eyelet holes.

3. Trace the word "Napkins" obliquely along the oblong, and work the letters in satin stitch.

4. Cut away the surplus material round the scalloped edge.

5. When the Napkins are inserted the Case is folded as shown in Fig. 2.

The pattern is drafted to hold Napkins 22 in. square and must be made smaller or larger according to the size of the Napkin.

NAPKINS

Decorative stitchery for Napkins confines itself chiefly to the working of monograms, which add a distinctive charm to the linen.

These may consist of a single initial or a two or three-lettered monogram. For Table Napkins the usual size of the monogram is from 2 to 3 in. It may be placed in the centre or in one corner of the Napkin. When placed in the centre it is advisable to work the monograms parallel to the weave of the material as they keep the shape better than when worked on the cross. When working monograms, the needle should be chosen carefully. If it is too large it makes holes in the linen and if it is too small the needle has to be jerked through the linen, thus drawing and pulling the work out of shape. A long narrow needle serves the purpose best. Monograms are invariably embroidered in raised satin stitches, these in some cases being combined with seed stitch and cord stitch. Fig. 3 shows a single initial worked in raised satin stitch. First outline the edges of the letter with running stitches to keep the shape of the letter. Pad the space between the running stitches with chain stitches worked in a thicker cotton than that used for the satin stitch. This will give the rounded effect to the letter which should always be kept. Work the satin stitch over the padding.

Fig. 4 shows a three-letter monogram, the two outside letters being worked in satin stitch, and the centre letter worked in seed stitch outlined with cord stitch.

Cord stitch is really very fine satin stitch. Work a single line of running stitches to form the padding. Cover this with small satin stitches, picking up only a minute portion of the ground material with the needle, Fig. 5.

Seed stitch is simply a small back stitch about the size of a pin head. Fill in the space formed with the cord stitch with seeding. Work the stitches in rows placed as far apart or as close together as desired. The closer the stitches are together the more they look like seeds, and the prettier the effect. The stitches of one row may lie exactly under the stitches of the preceding row, or they may alternate with each other, Fig. 6.

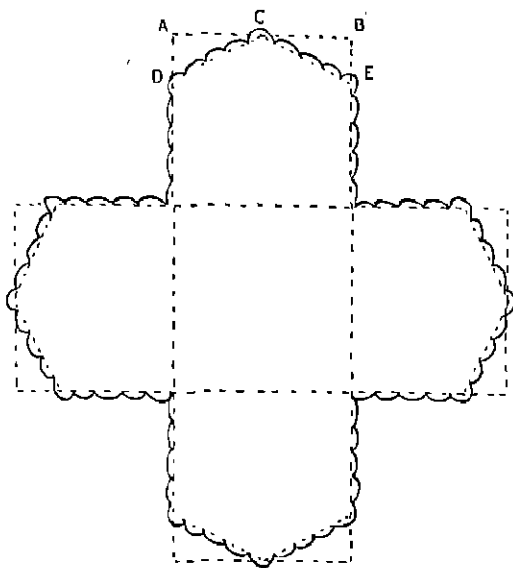


FIG. 1



FIG. 2

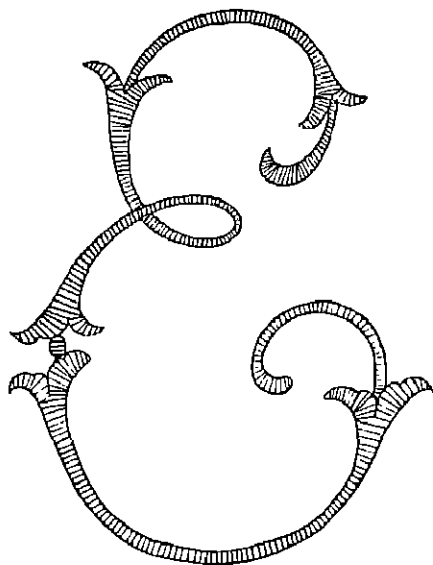


FIG. 3

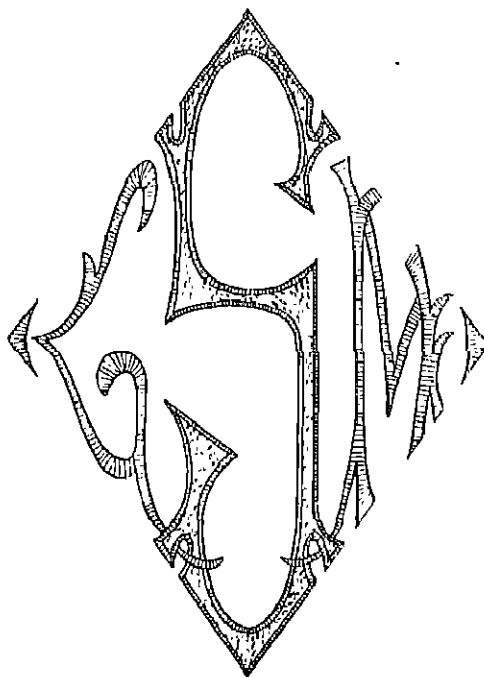


FIG. 4

NAPKIN CASE AND EMBROIDERED MONOGRAMS

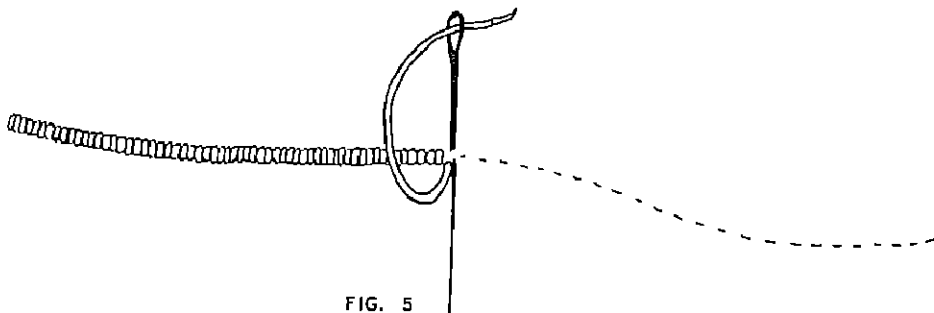


FIG. 5

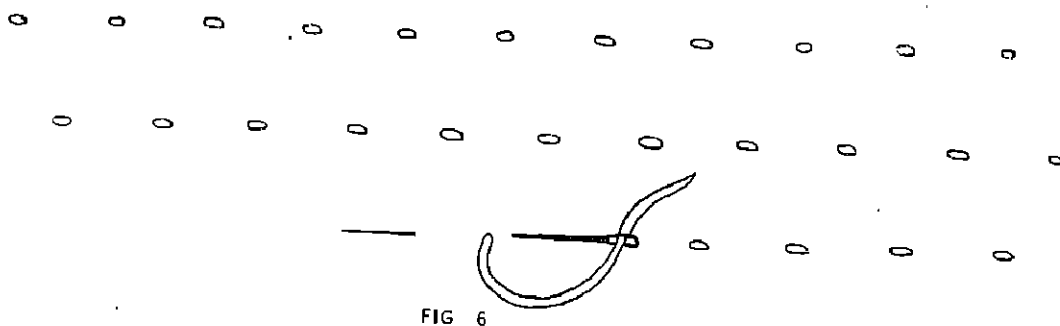


FIG. 6

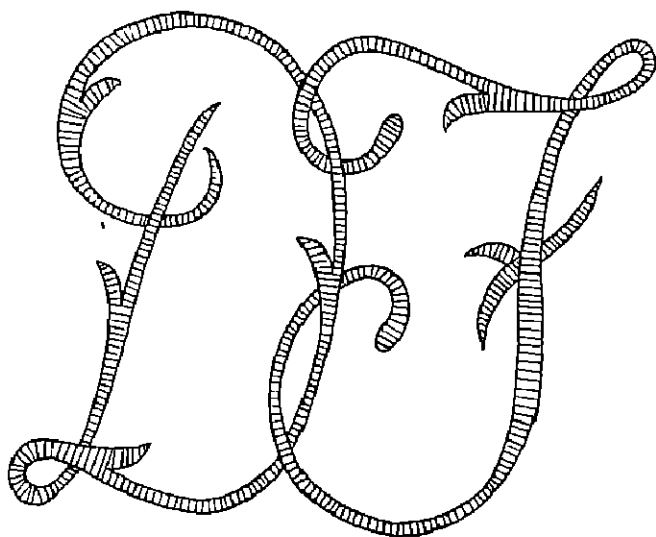


FIG. 7

Fig. 7 shows interlaced initials worked in raised satin stitch, and Fig. 8 shows a monogram encased in a "frame" worked in raised satin stitch and eyelet holes. The usual size for Dinner Napkins is 22 in., 24 in., or 26 in. square. They may be bought ready made or made from linen bought by the yard, a very narrow hem being turned and machine-stitched.

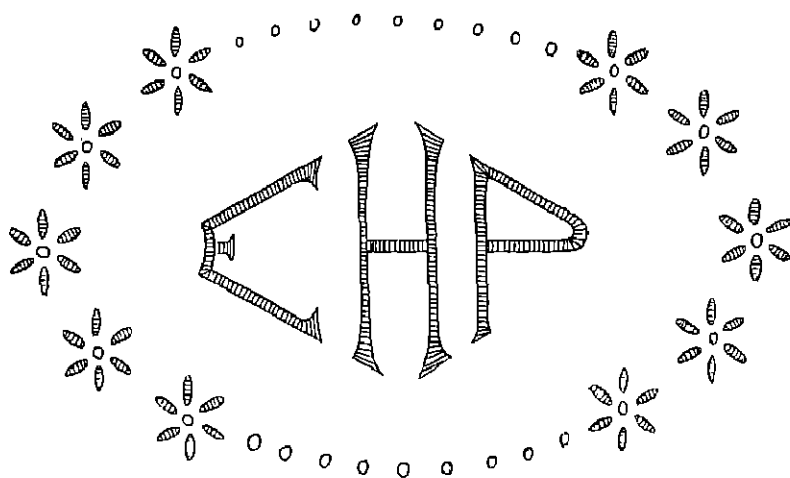


FIG. 8

AFTERNOON TEA NAPKINS

1. On the material mark 12 in. squares, and cut out allowing $\frac{1}{4}$ in. turnings along the edges.

2. Mark scallops along each side and work them in padded blanket stitch.

3. Trace a simple floral design in one corner and work it in raised satin stitch and eyelet holes or stem stitch, Fig. 9.

4. Cut away the surplus material round the scalloped edges.

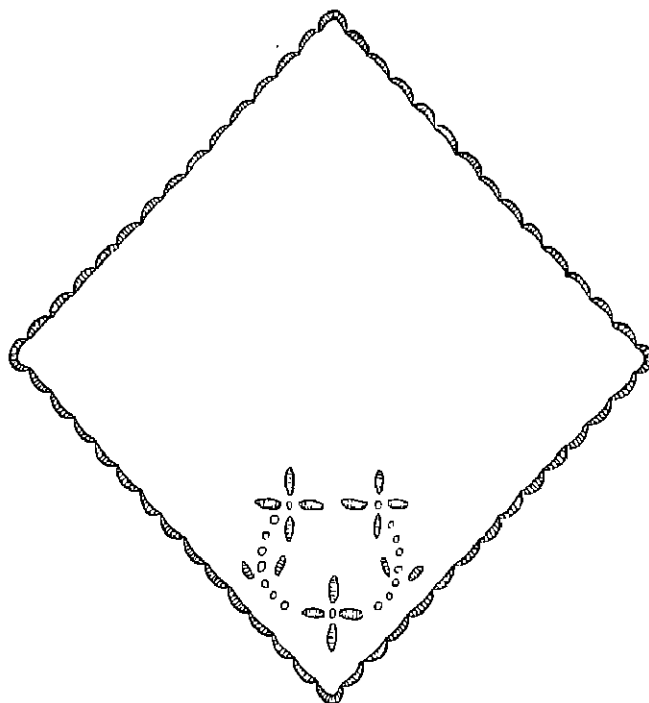


FIG. 9

NIGHTDRESS CASE

Teacher's requirements.—A piece of hessian; coloured wools; pieces of coloured materials; needle; scissors; pins; thimble; wadding; material for lining; drafting paper; pencil; ruler; chart showing suggestions of suitable decorative designs; completed Nightdress Case.

Children's requirements.—A piece of soft satin material; piece of soft silk material for lining; piece of wadding; coloured embroidery silks; small pieces of taffeta silk in different colours or pieces of organdie; needle; pins; scissors; thimble; drafting paper; pencil; ruler.

The pattern.—This may be drafted in a variety of shapes according to the fashion of the moment, but a most popular shape is obtained from an oblong 15 in. by 12 in.

Cutting out.—

1. Place the long side of the pattern to the fold of the satin material and cut out, allowing $\frac{3}{8}$ in. turnings on all edges.

2. Cut out a similar piece in the lining silk.
3. Cut out a piece of wadding equal to twice the size of the pattern; i.e., 30 in. by 12 in.
4. Cut a strip of satin material $1\frac{3}{4}$ in. wide and long enough to form a pleated frill along two of the 15 in. sides and two 12 in. sides; i.e., about 164 in., allowing for material to be turned in at the ends.

Making up.—

1. Fold the satin oblong in two and on one side (which will afterwards become the front of the Case) work a design such as that suggested in Fig. 1. This consists of a basket of flowers, the basket being outlined in (a) straight stitches, (b) very fine chain

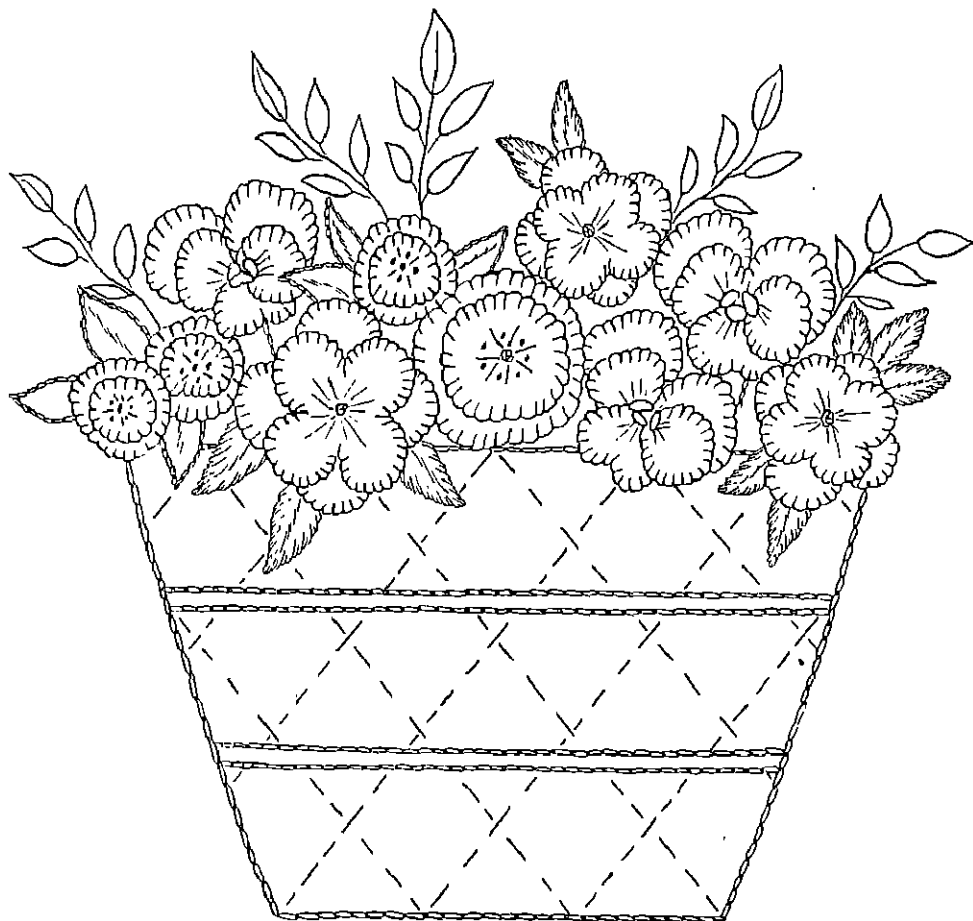


FIG. 1

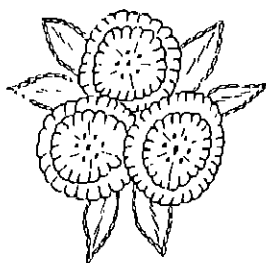


FIG. 2

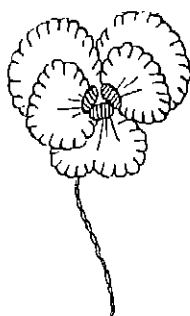


FIG. 3

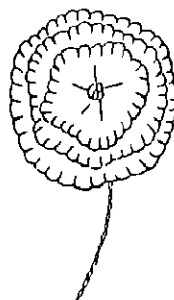


FIG. 4

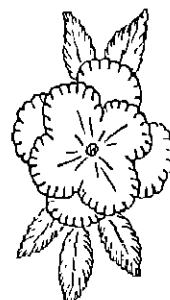


FIG. 5

stitches, or (c) a combination of both. Flowers and leaves of different kinds may be worked on the satin background, or the leaves only may be worked on the background and the flowers made to stand out from it. In this case the petals are cut in different shapes from the pieces of taffeta or organdie, their edges blanket-stitched and arranged to form flowers such as those shown in Figs. 2, 3, 4 and 5. A very beautiful effect may be obtained with this design if the right tones are chosen for the petals of the different flowers and for the silks for edging the petals.

2. Double the strip of material in two lengthways and arrange it in small pleats. Place the raw edges of the strip to the raw edges of the front of the Case only on the right side of the material, and machine the pleated frill in position along the three edges (the pleating ends at the fold on the two side edges). Turn the pleating up so that the raw edges fall inside the case, and tack them down.

3. Similarly place a pleated frill along the bottom edge and tack down the turnings of the remaining edges.

4. Place the wadding to the wrong side of the lining, fold over the turnings and catch-stitch them down to the wadding. If desired, rows of machining may be worked across the lining and the wadding to give a quilted appearance.

5. Place the padded lining with the wadding to the wrong side of the satin piece and slip-stitch the two together along all the edges.

6. Double the case in two along the fold and slip-stitch the two edges together along the sides, thus forming the completed Case, Fig. 6.

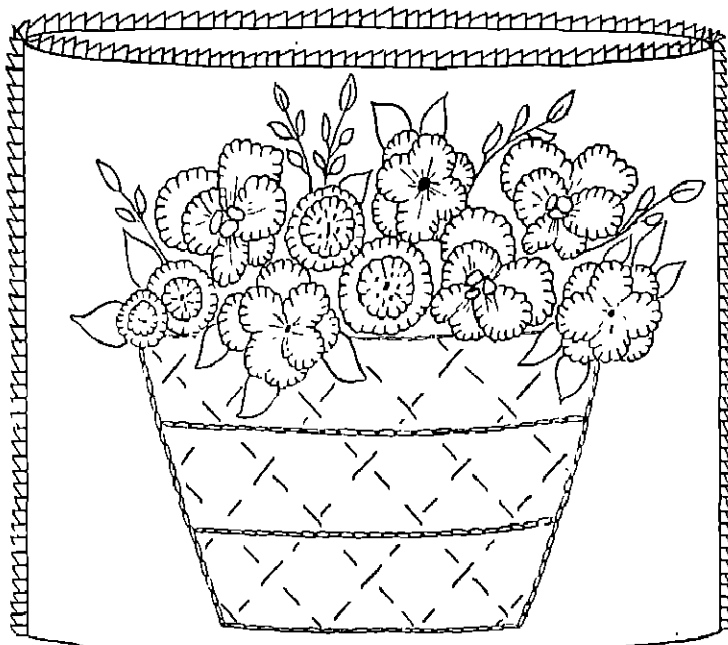


FIG. 6

TABLE RUNNER

Teacher's requirements.—A piece of crash; coloured wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler; pattern; chart illustrating suitable designs; completed Table Runner.

Children's requirements.—A piece of linen or crash; coloured embroidery silks or wools; needle; scissors; thimble; pins; drafting paper; pencil; ruler; tape measure.

The pattern.—Draw a circle with diameter 12 in. Measure the radius of the circle round the circumference, dividing the circumference into six equal parts, Fig. 1. Place the ruler across the circle with the edge passing through two of the divisions; e.g., A and B. Draw a straight line from A and another from B for 16 in. on each side of the circle. Similarly draw a line 16 in. long

from C and D. Join the ends of these lines with a curved line to correspond with the centre circle. Cut out on the pattern lines.

Cutting out.—Place the pattern on the material and cut out, allowing $\frac{1}{2}$ in. turnings all round.

Making up.

1. Turn a hem on all edges on the wrong side of the material, snipping the turnings carefully where the ends and the circle meet.

2. Hold the hems in position with any fancy blanket stitching or border stitch, completing the circle with the same stitching, Fig. 3.

3. Divide the circle into sections as in Fig. 2, and fill in each section with an embroidered floral group, Fig. 4.

4. Divide each end as shown in Fig. 2 and work a floral group in each section.

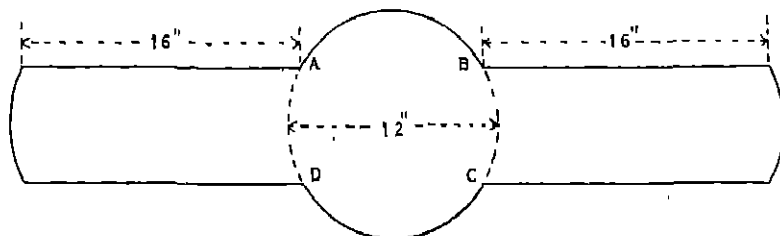


FIG. 1

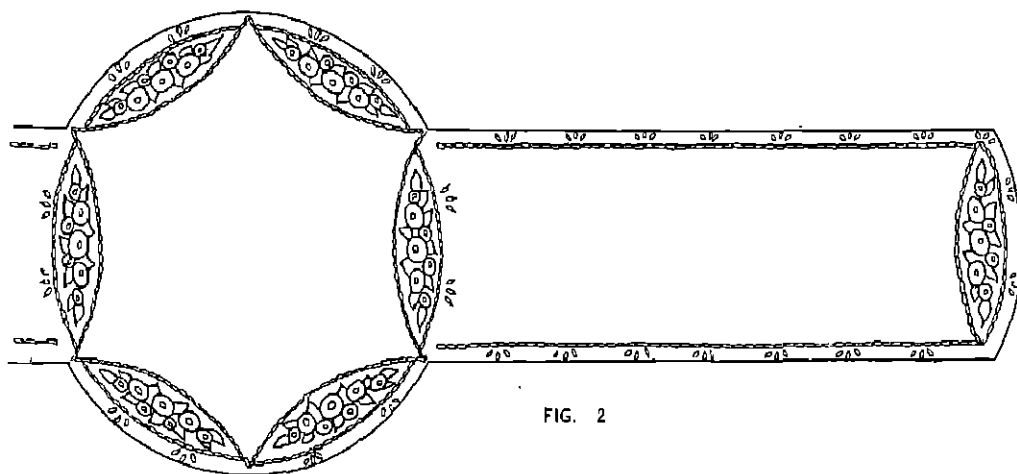


FIG. 2

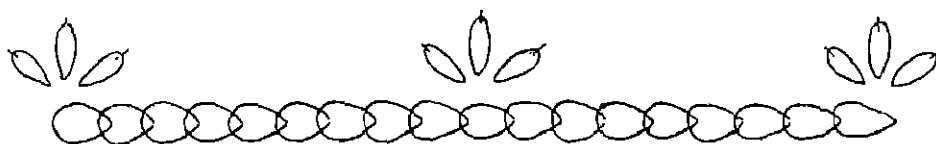


FIG. 3

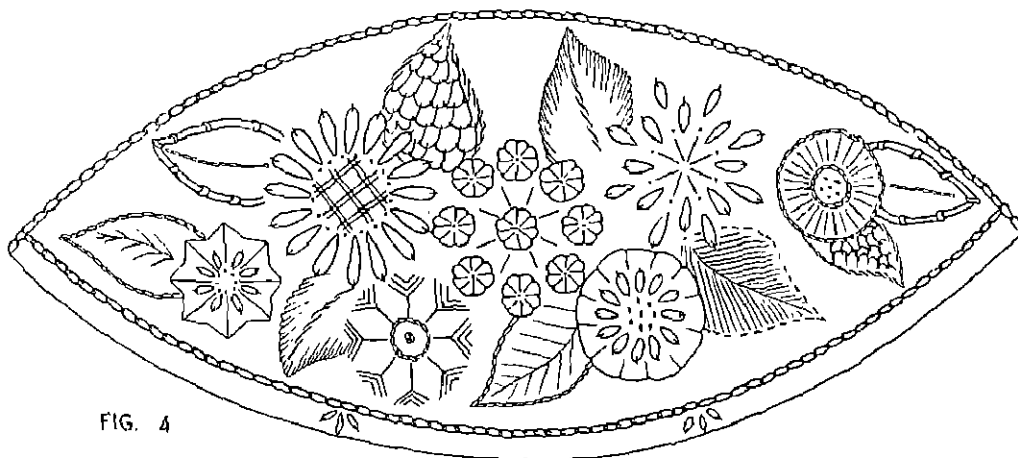


FIG. 4

CIRCULAR CUSHION

Teacher's requirements.—A piece of hessian or crash; piece of material to represent the lining; piping cord; kapok to fill the lining; coloured wools; needle; thimble; scissors; pins; patterns; drafting paper; pencil; ruler; compass; sketches showing the processes involved and illustrations of suitable decorative stitchery displayed on a chart; a completed Cushion.

Children's requirements.—A piece of artificial silk; piping cord; piece of sateen to tone with the silk; kapok; embroidery silks; needle; pins; scissors; thimble; drafting pencil; ruler; compass.

The pattern.—Draw and cut out an oblong 76 in. by 15 in. and a circle 10 in. in diameter.

Cutting out.—Cut out the silk cover from 1 yd. of 50 in. wide material as in Fig. 1, and

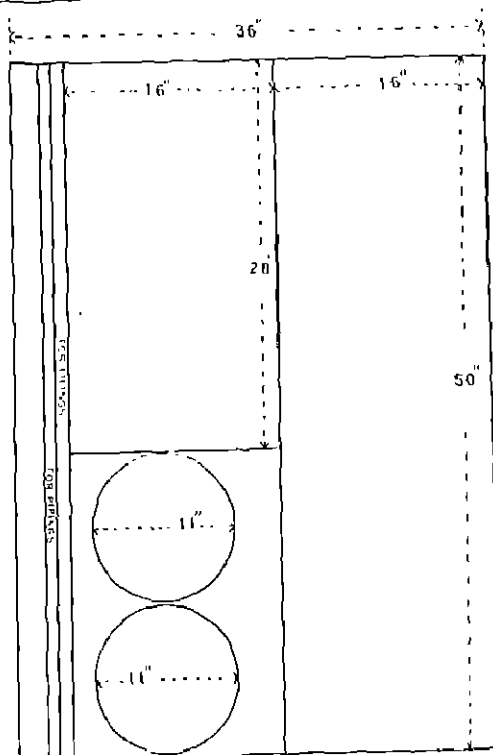


FIG. 1

cut out the sateen lining from $1\frac{1}{4}$ yd. of 36 in. wide material as in Fig. 2. In both cases $\frac{1}{2}$ in. turnings are allowed for all joins.

Making up.—

1. Join the two pieces of silk 50 in. and 28 in. long with machine-stitched joins to make a ring of material 76 in. long and 16 in. wide.

2. Divide each long edge into four equal parts and mark with pins.

3. Along each long edge run a gathering thread $\frac{1}{2}$ in. from the edge, Fig. 3. If desired, one or two pin tucks may be run along the length of the material with a gathering thread placed 2 in. or 3 in. away from the long edge.

4. Cut two lengths of piping cord $31\frac{1}{4}$ in. long, and join each into a ring by stoating the ends together as in Fig. 4.

5. Over each piping cord fold the 1 in. strip of material and tack it in position just under the piping cord, Fig. 5. Overlap one

end of the material on the other for the join and slip-stitch.

6. Divide each cord into four equal parts and mark with pins.

7. Place the raw edges of the covered piping cord to the right side of one of the gathered edges of the large ring of material, having the pins fitting to the pins, Fig. 6.

8. Draw up the gathering thread to fit the cord, regulate the gathers, tack in position, and then machine close to the piping cord, Fig. 6.

9. On each silk circle draw a design such as is shown in Fig. 8. Fill in the petals with long and short stitch or satin stitch, the centres of the flowers with French knots, and the leaves with a variation of cretan stitch to form a vandyke shape, or long and short stitch.

10. If preferred, a butterfly or bird may be traced on the silk and embroidered, or an appliqué *motif* may be worked.

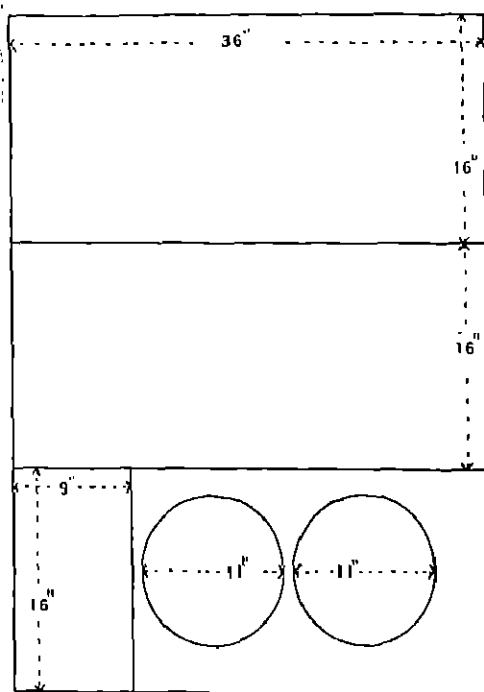


FIG. 2

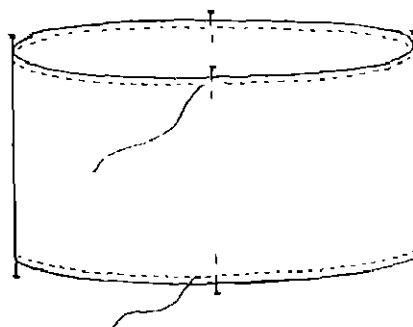


FIG. 3

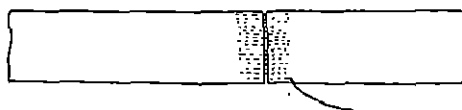


FIG. 4

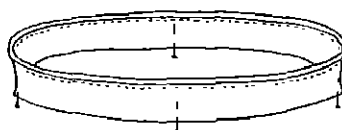


FIG. 5

11. Divide one of the circles of material into four equal parts round the circumference, and mark with pins.

12. Fix the piping cord attached to the Cushion round the outside edge of the circle on the right side of the material, laying pin to pin and having all the turnings lying inside. Tack in position and then machine the two together close to the cord, Fig. 7.

13. Fix the second piping cord in the same manner as the first to the other gathered edge of the Cushion.

14. Attach this cord to the remaining silk circle in the same way as already described, machining three-quarters of the distance round the cord only, to leave an opening for the cushion pad to be inserted.

15. Join the 16 in. wide pieces of sateen to form a ring 78 in. long.

16. Gather up the long edges in the same manner as the Cushion Cover to fit the circles of sateen.

17. Machine them together on the wrong side of the material, machining all round one

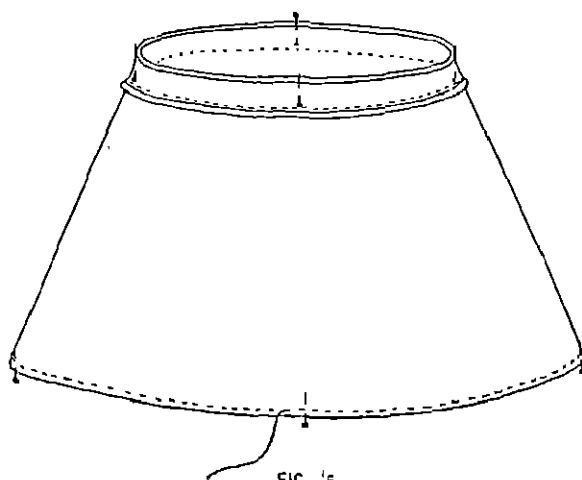


FIG. 6

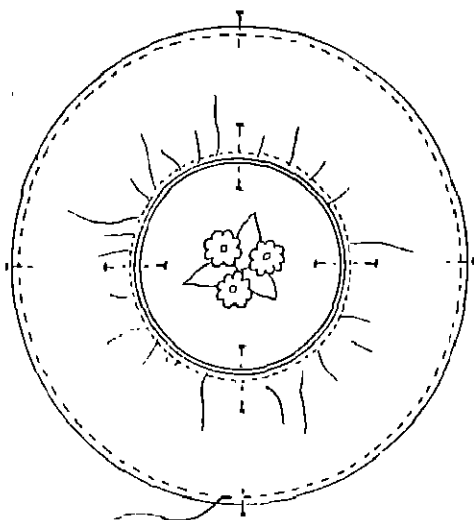


FIG. 7

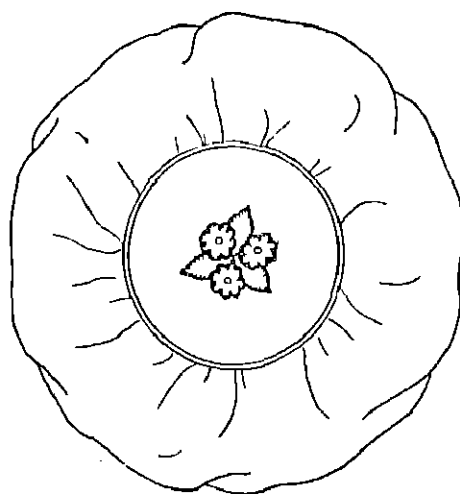
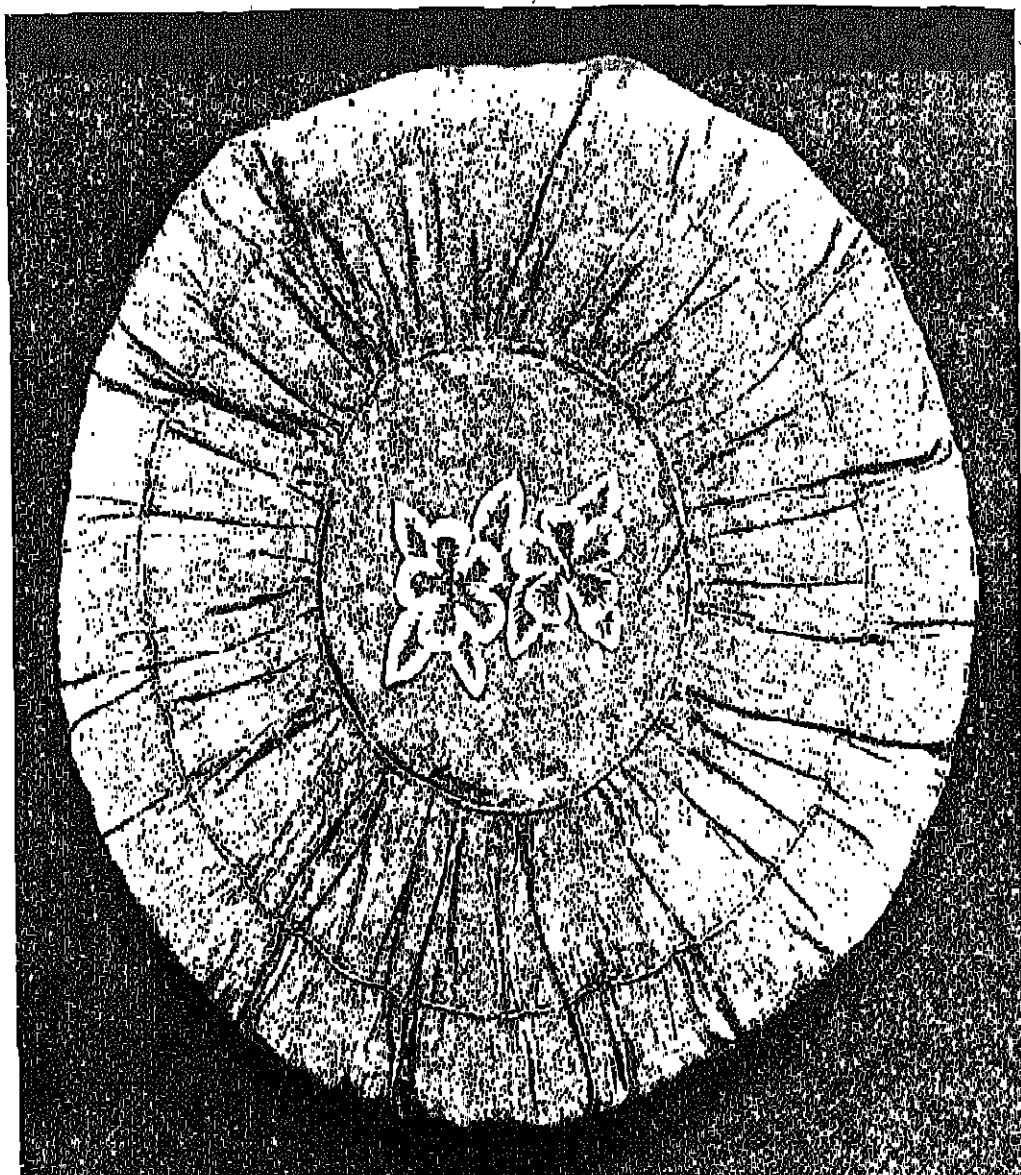


FIG. 8



CIRCULAR CUSHION

circle and three-quarters of the distance round the second circle.

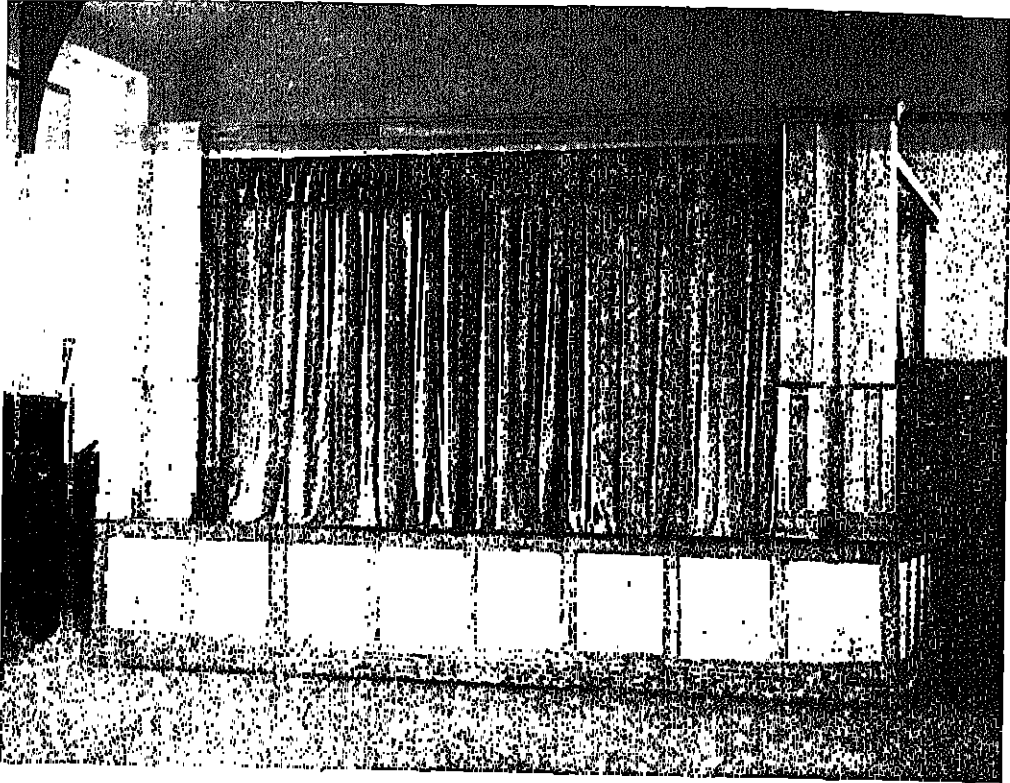
18. Fill the lining with the kapok, and sew the open edges together firmly.

19. Slip the pad into the Cushion Cover, place the cord over the open edge and

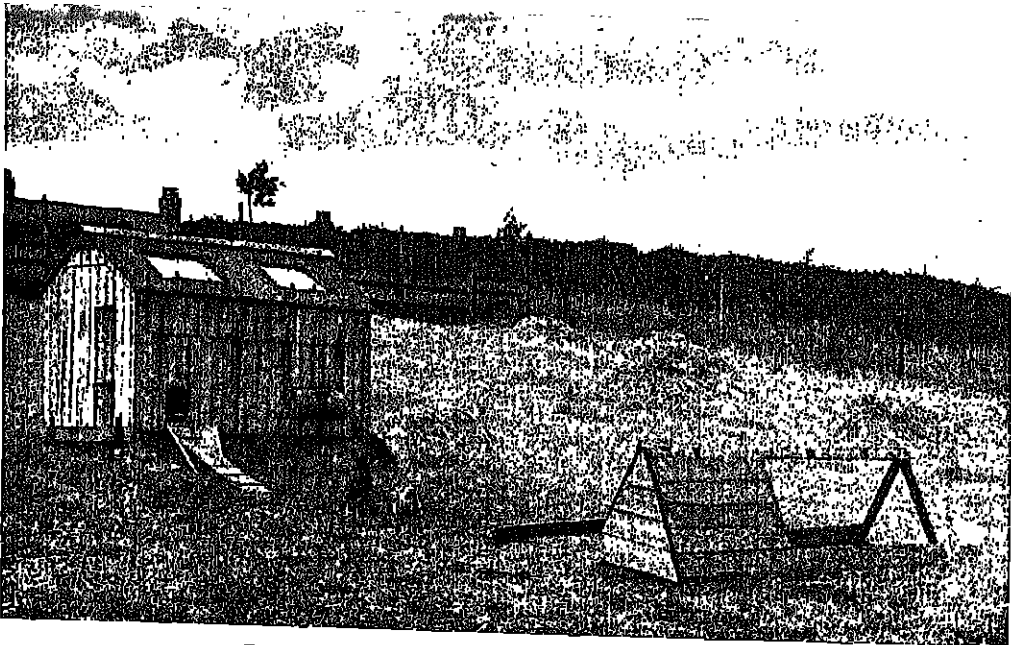
stitch it in position at the base of the cord, Fig. 8,

20. If pin tucks have been added draw up the gathering threads to requirements, regulate the gathers and end off the threads.

THE TEACHING OF WOODWORK IN THE SENIOR SCHOOL



STAGE BUILT BY SENIOR SCHOOL BOYS



POULTRY UNIT CONSTRUCTED AND USED BY BOYS

INTRODUCTION

IN considering the place of woodwork in the senior school, due regard should be given to the strong emphasis now laid upon the cultural value of training in art and craft as a means of appreciation. The utilitarian values are already fully recognised and woodwork is no longer an isolated "subject" to be taught in a separate building for the purpose of carrying out the odd repair jobs occurring in the school, or for the purpose of providing a refuge for the backward child. Nor is it an essentially practical activity masquerading only as an academic means of assistance to otherwise sluggish mental effort on the part of the pupils.

The scope of the work.—Craftwork, and woodwork in particular, has reached a stage of development in which wideness of scope and outlook is combined with sound, systematic teaching. For this reason, and in view of the aim mentioned above, any progressive course developing along such lines must entail a direct connection with most of the other constructive, practical activities being carried on in the school.

The art room, the craft room, the science room and the school garden will be directly concerned at one time or another with the various pieces of work made in the school workshops. Taken in the same order as the rooms referred to above, a clock case with pattern veneer, a treadle loom, an observation beehive, and a rustic or a framed-up garden seat are but single instances of projects necessitating not only a varied knowledge of construction and decoration, but also much previous study of the principles of elementary design and their application to practical work.

At times there is also bound to occur a direct connection between woodwork, metalwork, and the lighter crafts such as weaving, bookbinding and pottery. All these may not be taught in any one school. They will not all appeal to the same extent to the children in any school, but they have the interest of all children in common with woodwork for boys and housecraft or needlework for girls, in that they provide both the opportunity for thinking out a project—which may occur first as a mental picture or as a desire to reproduce an article seen elsewhere—and the opportunity for carrying out their ideas in actuality.

In this practical expression of his, or her, ideas, the child learns rapidly and naturally the essentials of craftwork: the possibilities of the particular material; the correct (and easiest) use of the tools involved to produce a good result; the inescapable results of slipshod, careless workmanship; a reasonable idea of comparative accuracy, and a practical demonstration of the principles of good design, decoration and proportion as taught in the art room.

For the able child such craftwork provides the widest scope. For the backward child it provides the finest assistance and encouragement to gain confidence in himself, to justify his belief that there is something that he can do well, and to develop those qualities in which he seems to be lacking.

The type of work to be done.—The craftwork in wood will naturally take the form of making useful articles mainly for indoor purposes. The making of either indoor or garden furniture compels the designer to study the setting in which it is to be placed. Thus some appreciation of the simple principles involved in both interior decoration and garden layout is made compulsory before any design may be completed. The simple treatment of colour schemes; the curtains and other soft furnishings to harmonise with the timber colour; the finish and style of any particular piece of woodwork; the design, colouring and texture of

rugs and carpets; the types, mounting and hanging of pictures to match the general scheme; the tint and finish of walls and floors; and finally the general arrangement of the room concerned: all these matters have their direct bearing upon the design, decoration and finish of each individual article of indoor furniture. Similarly, other considerations affect the design of rose arbours, trellis work, screens, garden seats, fencing, gates, verandahs, pavilions, etc.

It is this realisation of the part played by any such unit in a general scheme that makes this work of cultural as well as of practical value, and which decides the form that the course shall take.

As a means to this end, all schools capable of carrying out such a project, whether rural schools or otherwise, are being encouraged to combine all these aspects in one scheme of work. This, it is suggested, might take the form of decorating and furnishing one small room, where one is available, such as the staff room, or, failing that, suitable portions of the school buildings.

The furniture may be made in the school workshops. Rugs may be made to harmonise with the general colour scheme and with the design of the furniture. Curtains, if not desired plain, may be screen-printed or hand block-printed in patterns conforming to the general scheme. The pictures may be drawn, painted or block-printed in the art classes; then mounted, framed and hung. These stages of the work are just as important as the actual drawing or painting. The work in book crafts and bookbinding may be placed upon the shelves. The making of metal articles and pottery, if suitable rooms are available for this work, will assist a carefully planned scheme. Finally, if it is possible to include a door or window looking out upon the decorative portion of the school gardens, the latter may be laid out to complete a pleasing scheme by the addition of such outdoor craftwork as properly constructed sundials, walls of brick and tile, paths, rose walks, seats, bird shelters, terraces, etc.

The purely practical value of the craftwork may be utilised and adapted in this way, in conjunction with the art teaching, for the general raising of the level of good taste and appreciation which forms the true aim of the teaching of these subjects.

SCHEME OF WORK

The woodwork scheme is grouped under three main headings:

1. The disciplinary manipulation of tools; i.e., the training section of the course.
2. The constructional and decorative section; i.e., furniture making. This is chosen as being the type of work most effective in imparting training and knowledge in fine craftsmanship, suitable decorative processes and varied and exacting finishing processes.
3. General constructional; viz., outdoor furniture, etc., and apparatus.

The second and third groups are not taught separately or consecutively, or in any particular year of the course. Both types of work may be in progress at any one period and will in fact extend throughout the second and third years, while occupying in certain cases a small portion of the first year.

The only differentiation which may be made, will occur in the allotment of work to groups of pupils who are in this subject, of definitely differing attainment.

The group system.—It is common practice in many senior schools to grade the pupils for academic purposes into three classes as "A," "B" or "C" in conformity with their general standard of achievement in academic subjects. It will be found as a general rule that the

scholars of the "A" category will be more capable of good craftwork than those in the "B" group. They will do the best work in the second part of the scheme which requires greater attention to finish, forethought, perception of the finer and more delicate processes and needs of work carried out in hard and fancy woods, and a clearer understanding of the simpler qualities of good and appropriate design.

A certain number of the "B" category will also come under this heading for consideration. Others of this category, and those classed in grade "C," will find their progress more rapid and successful when occupied with the larger and more straightforward constructional work of the garden, or those sections of the apparatus work which do not require such a high degree of finish and skill.

For these reasons it will be found to be advantageous, and even necessary, to put all comers through the initial stages of the disciplinary part of the course as a class. The right use of tools; their introduction for special processes; the correct methods of setting-out, of working procedure and of finish of surfaces must at first be taken as a class exercise in each case. Without thorough training in these all-important stages and steps nothing of value can ever be accomplished afterwards. Bad habits of tool manipulation or slovenly methods of working can seldom be eradicated at a later stage, when the teacher is confronted with a full class engaged upon individual work with all its attendant difficulties.

As this first stage progresses it will be found that every class of whatever category will resolve itself into three main groups: (1) those who forge ahead rapidly and acquire the new knowledge, skill, etc., quickly—and are thus kept waiting for their slower companions; (2) those who keep an even steady rate of progress—the largest group—on a level with the rate of teaching; and (3) those who for various reasons have to be classed as "backward"—who seem to find great difficulty in handling the tools with any degree of confidence or accuracy and who have to perform every operation several times before getting it right.

As it is useless from the teaching point of view to allow any work to pass in these early stages unless it is correct—or at any rate is the boy's or girl's absolute limit of endeavour—it becomes necessary to regroup the class as soon as these varying degrees of attainment become obvious. The teacher is then enabled to keep each group working at maximum effort without loss of interest or other difficulties occasioned by the varying rates of progress. Admittedly this entails the duplication of demonstrations, explanations, etc., but it is well worth while for the sake of the better progress that is made. The forging ahead of the best group acts as a great incentive to the others to do their best work and sets a standard for all the others to follow.

As soon as the primary stages of the course have been covered a period is entered upon which is a combination of the first stages of classwork with the individual work that is to follow later. During this period the pupils have a limited choice as to the decorative finish of the set articles to be made. Only three such articles are necessary in the scheme dealt with here, but they are designed to cover the essentials of carcass construction, table construction, and the commoner forms of decorative processes—inlaying, veneering, ornament in low relief, edge shaping and chamfering.

Thus during this time the teacher will be able to utilise any one demonstration or explanation for the benefit of the whole class, although individual pupils will be working on different projects.

The value of the intermediate period of the course.—The real value of this most important period is the introduction it affords for individual work—with the pride and interest accompanying such achievement—along with the opportunities that it provides for the study

of varying styles of decoration and finish on similar articles, and also of the suitability or otherwise of certain timbers for particular designs and processes.

The children cannot be expected to possess a knowledge of good taste in design, hence it is important to ensure that plenty of opportunity is afforded them for the observation of pieces of good craftsmanship and fine design. This should be done either by visits to museums and collections, or to good exhibitions or shops, or by the provision of photographs and periodicals containing suitable and varied designs. These should serve as object lessons and should be used for purposes of comparison with the boys' own work. The teacher should discuss with them the simpler essential points exhibited, such as the proportions of rectangles, restraint in the use of curves and other decoration, and the finish of surfaces.

In this way, step by step, the boys will be helped to form their own definite opinions and to make constructive efforts at designing their own work, instead of adding items of decoration in a haphazard fashion to the essential form of carcass or table.

In displaying such photographs or pages from periodicals it is advisable to place them in a display cabinet fixed to the wall. A cabinet about 18 in. in height and extending the length of any suitable blank wall space will be found to be most useful. Glazed doors, preferably of the sliding type, should be fitted. The illustrations are well protected in this way. They should be changed at regular intervals or otherwise interest will flag. Most of the effectiveness of illustrations is lost if they are kept always in a folder or folio and seldom seen, or produced only for the consideration of a particular job.

Individual work.—The final stage is reached when the class enters upon the period of individual work in which all the knowledge and practice gained so far is brought into play. Certain fresh processes are bound to be needed and fresh difficulties will arise, but the work will benefit enormously if this stage is reached successfully. Success, however, is impossible unless the earlier groundwork has been thoroughly taught and practised, and this fact cannot be too highly emphasised.

A great deal of harm has been done at times by well-meaning efforts to decry the need for sound preliminary training. The cry of, "Let the boy get on and make something!" may bring a temporary and spurious satisfaction to all concerned, but the actual result is that nothing really worth while is ever accomplished. Certainly, nothing worthy of the name of craftsmanship can ever be achieved without steady training and earnest effort; and this applies not only to woodwork but to every major craft.

On the other hand it must readily be admitted that there has been provocation for criticism of the training course; but that provocation no longer exists. The time has gone by when it took three years for a boy to reach the standard required to make a towel roller; when every tool operation introduced needed for its practice a complete "model" incorporating every stage that had gone before.

That was the other extreme. It is now realised that no amount of mere repetition will improve the knowledge of the pupil. Rather will it cause failing interest and lack of concentration. What does count is this very concentration of the teaching given in the intensified course, and the insistence upon the utmost striving for accuracy of craftsmanship and for care in finish.

The essentials of good woodwork.—In planning the early stages of the scheme due importance should be given to the essentials of sound constructional work in wood. These may be stated as follows:

1. A clear conception of the job to be done, necessitating either (a) a dimensioned scale drawing; or (b) a dimensioned pictorial sketch with scale detail.
2. Accurate dressing and squaring of the timber.

3. Methodical and correct settling-out.

4. Sound joints, which entail proper tool manipulation.

Other details such as shaping, boring, chamfering, etc., upon which so much time has often been spent during the early stages, may safely be left until occasion arises for their use. The whole effort at this time should be concentrated upon the foundations and not be diffused for the sake of continually introducing fresh tools—and difficulties.

The position in regard to this much debated point is parallel to that of the choice of work to be done. If a pupil can use a plane, tenon saw, try-square, rule, gauges and chisels properly, he will have little difficulty in learning to use the brace or spokeshave. Similarly, if a pupil can make properly a small, highly finished article such as for instance a stationery cabinet, he will not be unduly worried by the construction of a pair of steps or a cold frame. But, the converse in each case does not follow; and that is one reason why the "small furniture" type of scheme is so generally adopted.

Outline of the scheme.—The final arrangement of the scheme will be roughly as follows:

CATEGORIES "A," "B" AND "C"

(First month to second month)

Disciplinary stages—correct stance, tool holding and manipulation. Use of drawing instruments and construction of simple scales. First lessons on projections. Freehand sketching. Dimensions.

(Second month to fifth month)

The common joints and their application—T-halving, dovetail halving, bridle, mortise and tenon, housing. Chamfers—shaping, cleaning up, application of these. Drawing continued as above.

(Fifth month to ninth month)

Long-and-short shoulder mortise and tenon joint. Rebates. Through and lap dovetails; application of these. Drawing continued.

CATEGORIES "A" AND "B" PLUS

(Ninth month to fourteenth month)

Intermediate course. The fundamentals of table construction, carcass construction, decoration. Limited choice of the latter. Use of dimensioned sketches and part-scale drawings. Sectional elevations. Detail.

(Fourteenth month to end of second year)

Individual work. Pupils' suggestions discussed, checked and altered where necessary. Smaller work.

(Third year)

More advanced individual work. Apparatus making, or garden work in wood and other materials.

CATEGORIES "B" MINUS AND "C"

Set work of plain constructional character. Incidental processes. Use of sketches and drawings as for "A" group.

Note.—Some pupils in this category will "graduate" after a time into "A" or "B" plus groups.

(Second and third years)

Individual and group projects of above types. Some straightforward indoor work of the kind taken earlier by "A" group. Apparatus making and garden work in wood and other materials.

It should be appreciated that such a rough and ready representation of the scheme is only an approximation to actual facts in so far as the time limits are concerned. In various areas and schools with differing types of children, local industries, outside conditions, equipment, and variations of time-tables, the development of such a course may vary in its period by as much as a year.

Again, it should not be assumed that the "A" and "B" plus categories will be restricted entirely to furniture making. They may, and should, take their part in the general school projects suggested earlier in this Introduction.

Neither is it intended to suggest that the particular articles quoted in this scheme, and illustrated in subsequent pages, are the only ones to satisfy the requirements of such a course. A wide variety is possible in the choice and design of individual exercises and projects that may incorporate the essential processes and constructions. Much will depend upon the circumstances of the particular school and the inclinations or previous training of the teacher.

Local industries.—These should be given full consideration when drawing up the details of the scheme. Once the concentrated training section is covered and individual work begins, a large proportion of the work should be related to any important local industry. Pottery, furniture making, bookbinding and allied printing trades, textiles, shipbuilding, agricultural work should each have as great a bearing upon the style of job introduced as is reasonable and possible in any one workshop. It is not the place of the senior school to attempt to usurp the functions of the technical college or school of art, and in no sense should the work be regarded as purely vocational in character; but the influence of any local industry will have a most beneficial effect upon the interest displayed in the work both by the pupils and their parents—the importance of which should not be minimised.

The place of technical drawing.—It will be noticed that instruction in technical drawing for its own sake is almost entirely dropped approximately at the end of the fifth month of the course. It then takes mainly the form of dimensioned sketches, pictorial views, and enlarged details of construction. Scale drawing is used after that time only for necessary work such as the settling of general proportions, the exact scale of important details or sectional views.

It is contended here that as the time at the disposal of the woodwork teacher is in most cases so limited, and the actual benchwork is of paramount importance, it is not in his best interests or those of his pupils to spend any of that valuable time in teaching those aspects of plane and solid geometry that will not be required for the practical work. Incidental work such as developments, sections and certain geometrical problems which arise in connection with simple building construction can be dealt with as occasion demands.

The one really important part of this side of the work which must be thoroughly understood and practised by the pupils is the sectional elevation, or plan. It is the most valuable view from the constructional standpoint. It concentrates within its boundaries the greater portion of the structural detail that is needed in any job having the carcase as its basis, and in conjunction with a front elevation it normally dispenses with the need for a plan and end elevation.

Notes and records.—Instead of devoting the first half-hour of any class meeting to a set talk on timbers, seasoning processes, etc., it is suggested that such information as may be valuable or necessary should be given at the time when the need arises during the course of the practical work. Warping and casting of boards; the effect of damp on three-ply or laminated board; shakes in timber; the varieties of timber and of fancy woods used in the workshop, their habitat, characteristics, etc.; the reasons for the special forms of tools; the methods of sharpening them; the use of special tools and all such matters will be more readily understood by the pupils if they are explained at the natural moment that they occur. Concise notes and sketches should be made on the spot in a book kept for the purpose, and this method of teaching the theory of these things will be found to be much more valuable and greatly in advance of the arbitrary and isolated talk.

A class of boys being lectured upon these aspects of the work at the time of day when they are anxious and eager to begin the benchwork will be fidgety, and their interest and concentration will be lacking. If any such point is dealt with in direct connection with the practical work they are engaged upon at the moment, they will pay the keenest attention and will not forget it afterwards.

In the same book the pupils should be encouraged to make sketches and notes of good work seen both in and out of school. Local subjects of value should be pointed out to them by the teacher; such may be certain forms of church work; local building construction in progress (not of the jerry-built type, however!); characteristic tree forms such as sycamore (related to their Canary wood), beech, oak, ash, elm, walnut, etc.; and procedure and methods of stacking and covering in timber yards. Notes on standard constructions such as the boys are using on their own jobs should be included in the same book; also those notes on nailing, screwing, and the preparation and use of glue; the various polishes, processes and finishes used in the workshop; the special processes in construction and decoration such as rebating and veneering. All these essential facts arising incidentally are best assembled and kept in this way.

Tool sharpening.—The sharpening and care of tools is one of the biggest problems faced by the teacher of any major craft, and particularly so in the case of woodwork. Beginners cannot do their best work or attain a high standard if they are compelled to work with faulty tools. On the other hand the pupils are incapable of sharpening most of the tools themselves, for correct sharpening demands the skill that comes only by long practice.

It is possible at times to enlist the services of older scholars for sharpening tools, the teacher putting the finishing touches to them, but in most cases the whole of this work in the early stages of the course must fall upon the teacher himself. The only compensation lies in his appreciation of the fact that the more thoroughly this unpleasant duty is done, the easier the teaching will be throughout the later stages, and the better will be the results.

It is possible to introduce the pupils to the sharpening and grinding of their own tools by gradual stages, letting them "have a go" at it under supervision, the teacher finishing the job before too much harm has been done. The tools should, however, in fairness to both teacher and scholars be sent away at regular intervals to be put in order, and this step should not be regarded as a reflection on the skill of the teacher but rather as a testament to his foresight and care. Saws which need expert skill for correct sharpening should never be left to the experiments of the amateur or occasional user.

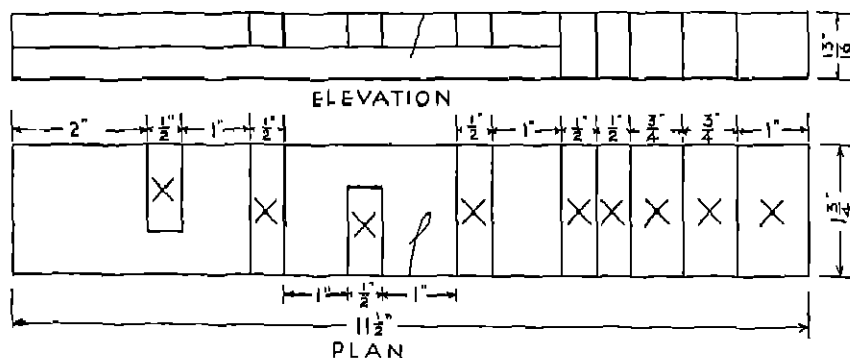
A large grindstone should form part of the standard equipment of every woodwork shop, but if used for sharpening agricultural implements a sharp eye should be kept upon it. V-grooves and soft spots will soon develop with careless usage, thus making the normal

sharpening of shop tools most difficult if not impossible. Much damage is also done to high class tools by the common practice of grinding them on a high speed emery grinder. The effect of this over a period of time is to take out the "temper" of the steel, thus making it impossible to get, and keep, a sharp edge.

FIRST YEAR: THE FIXED COURSE

"A," "B" AND "C" GROUPS

EXERCISE I—PLANING, GAUGING AND SAWING.—Planing is a difficult and tiring operation for the younger boys beginning the course. This should be borne in mind in order to avoid the necessity for hours of mechanical work that must follow if a correct start is not made. The fullest attention should be given to the stance of the boy using the plane for the first time and to the correct holding of the tool, for upon these factors depends the rapidity or otherwise of his progress.



EXERCISE I. PLANING, GAUGING AND SAWING

Although "drill" methods are nowadays not much in favour when teaching a whole class how to stand and use the plane, there is no system of teaching so valuable as the ten minutes of solid drilling in the best way; e.g.:

1. Stand to the bench.
2. Pick up the plane and hold it correctly.
3. Start, carry through and finish the movement of taking off a shaving, while keeping the left elbow well up. (The holding of the left hand and arm is an awkward thing at first but all-important.)
4. Lay the plane down—on its side.
5. Pick it up—in the *left* hand for adjustment, holding it with the thumb in the escape-ment. (This will save many handles from being broken later on.)

The method of removing the irons should be left till later, but even the essentials mentioned above are quite enough for a beginner to get used to and to remember—and they have to be taught all at once. These movements have to become habitual at the earliest possible moment and the best way to form such habits is to keep on carrying out the movements in a regular routine.

As soon as possible the boys should be given an odd piece of soft wastewood and should be shown the method of working across the width of the stuff by the removal of over-lapping shavings in a systematic manner from one edge of the stuff to the other. This may seem a trivial point but it enables them to keep their stuff at an even thickness whilst they reduce it, and one of the chief faults in planing is that very tendency to keep to one edge or one end, instead of taking each shaving right through the length; the fact not being noticed as a rule until the stuff is too thin at one or more points.

When these steps have been practised and the boys have a little confidence in their ability to produce a fairly plane surface, they are given the stuff for the first exercise. This is a piece of soft, clean deal or pine 12 in. by 2 in. by 1 in. The width and thickness are approximate.

The face side is planed and tested with a straightedge, both diagonally to see that it is not in winding—on the twist—and across to see that it is not hollowed at the centre or down the edges. The pupil should check his own work and, when satisfied that it is right, he should bring it to the teacher to be passed. Right from the start it is absolutely essential that no work should be continued until it has been passed as correct.

When satisfactory the face mark is placed on that side. The edge indicated by the tail of the face mark is then planed until it is square with the face side, being tested from that side with the try-square at intervals along its length. When correct and passed the face edge mark is placed upon it to join the face side mark at the edge.

It has continually and firmly to be impressed upon the class that all setting-out and testing takes place on or from these two faces.

Gauging.—Next comes another difficult operation for the beginner, that of gauging. The marking gauge, set by the steel rule, is used first to gauge the width of the stuff. The class is shown how to hold the gauge and run it along the stuff from the face edge, sloping it slightly forward to prevent the spur from digging in and jumping—the commonest fault.

The waste edge is now planed and tested from the face side when the gauge line has been reached.

The gauge is next set to the thickness required. Both edges are gauged from the face side. The waste is planed off and the surface tested as before. The stuff is finally passed as ready for setting-out.

The proper method of using the marking knife and try-square from the face edge is now demonstrated to the class. Then, at the right-hand end of the stuff, with the face edge to the worker, a cut line is made across the face side $\frac{1}{4}$ in. from the end. The remaining measurements are set off from the rule, all at the same time and not singly, using the marking knife and at the intervals shown on the diagram. Only those as far as the beginning of the gauge line are done at this time.

These are now squared across the face side and then, turning the try-square, across the face edge.

Next, the marking gauge is set to half the thickness of the stuff, and the face and opposite edges gauged from the face side from the last cut line along to the other end. The first group of cut lines has already been squared across the opposite edge at the same time as across the face edge.

The gauge is now set to $1\frac{1}{4}$ in. and put aside. The intervals between the last cut line and the stopped and through grooves are now set off and cut lines squared across the face side, face edge and opposite edge as required. The stopped grooves are gauged from the face edge only, the gauge being already set for the first one and then altered to $\frac{1}{2}$ in. for the other. To ensure early practice in setting-out from the face edge only is a most important point, for the temptation to turn the stuff round and use the same gauge setting from the opposite edge for the second line is strong.

All the measurements being checked, the last line is squared across the remaining end, $\frac{1}{4}$ in. approximately being left for waste, but the line is measured as 2 in. from the last stopped groove. It is squared across both edges and then the work, after being checked finally against the drawing, is ready for the saw.

The setting-out should be taken and demonstrated in short stages, continuous attention being paid to the correct use of the tools and to details of procedure. It is useless to run too far ahead of the children or so much of the detail will be ignored or forgotten by them. Also, it will be found quite often that some of the children are unable to use the ruler for measuring any unit smaller than $\frac{1}{2}$ in., and considerable time may have to be spent in teaching them to recognise and set off $\frac{1}{4}$ in. and $\frac{3}{4}$ in.

Sawing.—The use of the tenon saw is now demonstrated to the class. Again the correct stance is all-important, otherwise it is impossible for the boy to make an accurate cut. Using the bench hook the waste is sawn off the right-hand end and then in succession the remaining five pieces up to the beginning of the gauge line.

As each piece is sawn off the end should be checked with the try-square from the face side and edge. Faults should be noted and the stance corrected. One of the commonest faults causing errors is the natural tendency to try to assist the cutting of the saw by pressing heavily on the teeth at the beginning of the cut—a practice which causes loss of control and leads to making the saw jump.

When these cuts have been made, and the freshly cut end passed as satisfactory, the wood is turned round and the waste is sawn off the opposite end.

The exercise is now put aside, the stopped grooves being cut later with the through one.

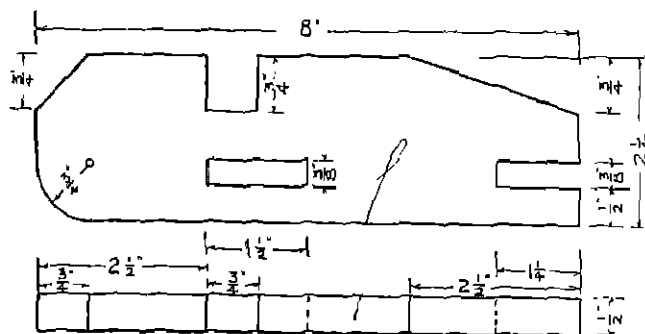
It is not anticipated that the sawing of half-a-dozen lines will cover all that is needed in this respect, but no benefit will result from too much repetition at this stage if the teaching has been thorough. Repetition alone is valueless and may induce bad habits most difficult to eradicate later on.

EXERCISE 2—PLANING, SAWING AND CHISELLING.—A piece of softwood $8\frac{1}{2}$ in. by $2\frac{1}{2}$ in. by $\frac{3}{4}$ in. is given to each boy.

The preliminary stages of planing up to the sizes given are carried out as before, each piece of work being checked by the teacher before setting-out begins.

The waste at the right-hand end is set off with a cut line; then the total length of the finished piece and, working back from the left, the other dimensions as shown in the diagram are set out, each being marked off with the knife to fix the positions of the two mortises.

The mortise gauge is now set to the sizes shown from the face edge. This must be demonstrated clearly to the children. When they are ready, and the gauges have been tested, short



EXERCISE 2. PLANING, SAWING AND CHISELLING

gauge lines are run for both the closed and open mortises on both sides of the wood.

Cut lines are now squared across the gauge lines from the points previously made and at this stage the class is cautioned as to the need for always using cut lines where cutting is to be done with the saw, also the need for avoiding the placing of any cut lines where they

will not be needed but will spoil the surface of the stuff. This requires much forethought in more advanced stages, when a shoulder line carried round needlessly at times will spoil the appearance of a whole job and its removal will mean a reduction of thickness throughout the whole of, for example, a door frame.

The opening on the opposite edge is now marked out and the children are again reminded of the need for cut lines. It should be pointed out to them that the cut line severs the fibres cleanly on the face and permits of accurate placing of the saw cut with a clean sharp edge to the shoulder, whereas a pencil line is too thick for accurate work and does nothing to prevent the tearing of the fibres along the edges of the cut by the saw. This point is best demonstrated by the boys themselves on a piece of waste wood. It may be pointed out to them, however, that when working on a large rough carpentry job, often with undressed timber, it would be absurd to use a fine cut line that could not be seen clearly and that a pencil line in such a case is sufficient.

It is also pointed out to them that the joints, or portions of joints as represented by the parts just marked out on the exercise, are always set out first. Afterwards, any shaping or decoration is marked out, and so the three pieces of edge shaping on the exercise are now marked: two with straight cut lines and the curve with the scribing compasses. All the marking out is duplicated on the opposite face of the wood.

The sawing now takes place and this brings the need for explanation of the method of allowing for the width of the kerf, or saw cut, on the waste side of the cut line. The cut, of course, should always be made right up to the line; this point is mentioned as it is no uncommon thing to see boys cutting well within the line on joint work and then attempting to clean up to the line with a chisel. They do not realise that it is much easier to saw to a line than to chisel to it, apart from the need in joint work for the rough sawn face which gives a better grip for the glue.

The cutting on the inside of both lines is demonstrated, with emphasis placed on the care in finishing the cut to the line squared across at the end of the open mortise. The wood is turned and the cuts across the grain also demonstrated. The class carries out this operation and the exercises are checked.

The mortise is cut next, after demonstration of the method showing the need for a special chisel and for the duplication of the marking out.

Then the work is placed on the bench hook and the class is shown how to remove the waste between the saw cuts, and how to clean off the inside shoulders. This introduces the firmer chisel, or the paring chisel if preferred.

Next, the waste is sawn off from the shapings almost to the cut line and these are finished—the long angle by paring along the edge with the grain, the short one and the curve by vertical paring. The latter is too small for a spokeshave and there are sufficient new methods and tools to cope with without adding to the difficulties at this stage.

The teacher should insist on obtaining clean chisel work from the boys, providing that their chisels are sharp, with a smooth surface and clean, sharp edges. Here again the stance and method of holding the chisel are all-important, especially in vertical paring, when the thumb should be on the top of the handle with the shoulder well over it. The mortise will be rough, but much cannot be expected at this stage and it serves as an introduction to the heavier joint later in the course. If preferred, as it is only being cut through thin stuff, the children may trim it up with a lighter firmer chisel.

EXERCISE 3—SAWING AND CHISELLING THROUGH AND STOP GROOVES; INTRODUCTION TO THE HOUSING JOINT.—The portion of Exercise 1 that was put aside is produced and used for this exercise.

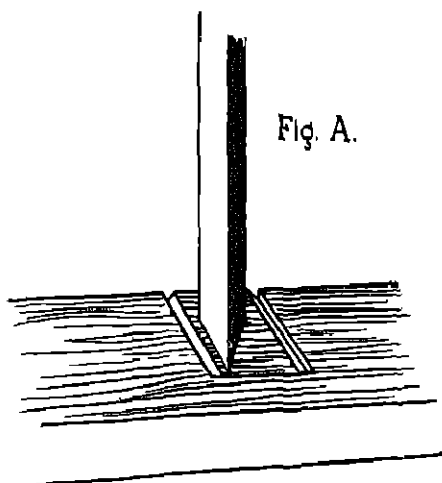
First, the through saw cuts are made to the cut line on the waste side, the class being shown how to keep a check on the depth of the cut on the far side and being reminded of the need for care in sawing to gauge lines for depth.

Next, the saw cuts for the right-hand stop groove are made direct in the same manner, judging the moment when the cut reaches both gauge lines. The other groove is left for the time being.

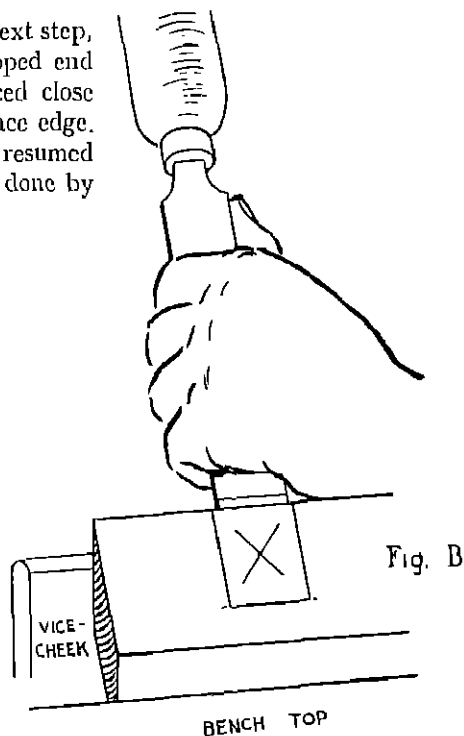
It is pointed out to the class that the saw cut can be carried only part-way into the sides of the groove and an intelligent lad will sometimes ask why the sides cannot be chiselled instead of being sawn, and be chopped along the cut line. Such a question provides an opportunity for showing that a line chopped in that manner straight from the surface of the wood will rarely be clean and straight, as the bevel of the chisel drives the face of the blade against the sides being cut every time the chisel is hit with the mallet, so that there is a slight difference between each cut according to the hardness of the wood and the strength of the blow.

This makes clear to the class the reason for the next step, which is to cut a shallow mortise across the stopped end of the groove (Fig. A) with successive cuts placed close together and to the depth of the groove on the face edge.

When this is completed the sawing can be resumed until the floor of the groove is reached. This is done by the class.



EXERCISE 3. METHOD OF CLEARING THE WASTE FROM THE END OF A "STOPPED" GROOVE



EXERCISE 3 (CONTINUED). METHOD OF HOLDING THE CHISEL FOR CLEARING THE WASTE WOOD

Now the chisel is held as shown in Fig. B, the heel of the left hand resting firmly on the edge of the vice cheek, the chisel blade gripped in the fist, and the thumb along the blade giving a rigid and well controlled grip. The handle is lowered until the blade is horizontal and then the chisel is tapped slowly forward with the mallet. The waste is cleared in this way until the gauge line is almost reached, when the right hand is substituted for the mallet and, holding the chisel normally, the floor is pared out clean.

The inner end of the groove is examined and, if necessary, pared out vertically. The class completes these operations and the work is checked.

So far, every operation has been demonstrated by stages, the class performing each stage immediately afterwards. At this point the first revision can take place, as, once the work has been checked, the children are instructed to cut the second stopped groove in the same way but without interruptions.

That being done successfully they are finally instructed to pare out and finish the through groove, working from both sides to the centre and finishing exactly on the gauge lines.

An alternative method of cutting the side shoulders of stop grooves is indicated in Fig. A. If desired, it may be used on this exercise but it is suggested that it be deferred until occasion arises for the cutting of a fairly long housing, when it will be found to be most useful.

The sawing of the sides in a longish housing joint is a difficult operation, as, although a mortise may have been cut already to clear the nose of the saw, the tendency is for the saw to slip away from the cut line. It is customary to use a wooden guide or straightedge clamped to the work, but a boy finds it extremely difficult to keep the saw against this without the same tendency to slide away from it.

The easiest and most accurate way to make these cuts is to put down a deep cut line first with the big try-square; next to hold the work on the bench with a hand-screw, and then gripping the chisel firmly in the left hand (heel on the wood and right hand directing the handle) to take out a small V-cut square into the cut line from the waste. This is carried right along to the end of the line, as shown in the diagram, and is repeated for the opposite side of the groove.

The saw can now be placed in this little V-groove and the slope of the cut side throws it up against the shoulder, making the use of a straightedge unnecessary whilst the saw cut is made to the required depth, and enabling it to be made easily without any tendency to slide sideways. The waste is then cleared with chisel or router.

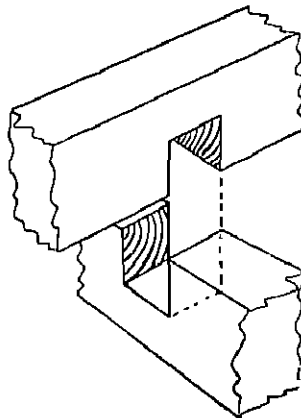
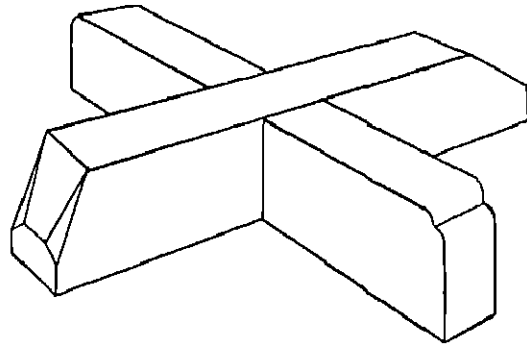
EXERCISE 4—CROSS-HALVING JOINT.—The stuff, probably about $1\frac{1}{2}$ in. by 1 in., is planed up to size in one length.

Waste is marked off at each end and from the lines the length of each member is set off, leaving some waste in the centre.

The middle of the length of each piece is marked and the marking gauge set to half the thickness of the stuff. The setting is checked by testing the spur point from opposite faces.

A short gauge line is run along the centre of each piece from the face edge and on each side.

The position of one edge of the halving is marked on each piece on the gauge lines by measuring half the thickness of the stuff to one side of the centre



EXERCISE 4. CROSS-HALVING JOINT

points and squaring a cut line across from the gauge line to opposite edges. In each case this line is then squared round to meet the gauge line on the opposite side.

The length of the end waste is now trimmed and sawn in two, the centre waste being cut out.

One piece is taken up and placed in position on the other so that the under edge just lies on the cut line of the other piece.

A mark is made close up against the opposite edge on the under piece so giving the exact thickness of the upper member. On no account should a line be scribed along the side but, after the upper member is removed, a cut line, made with the point of the marking knife, is squared round as required from this mark.

The halving on the under member is now sawn and cleared of waste to the gauge lines.

The upper member is placed in this halving and adjusted by the end being tapped until the single cut line coincides with the edge of the stuff on the under member.

A similar mark is now made on the edge of the upper member, the cut line squared round from it, and the halving on this piece cut. The joint is then fitted.

It is customary to measure the thickness of the stuff and to complete the halvings before the length is sawn in two, but the writer contends that the method stated in detail is the more commonsense one for this particular joint, especially at this stage with comparative beginners. Seldom is their stuff of an even thickness throughout its length, also they are almost incapable of accurately measuring to ensure a good fit. There is no logical reason why they should not mark out from the stuff itself as though they were using either a gauge or a rod, and by this means there is a much better chance of obtaining a good fit, which is the main object in making a joint.

The children now get their first instruction in cleaning up a joint and for this purpose the iron plane may be used for the first time. If the joint has been carefully made this will necessitate the removal of only one or two shavings.

Any shaping of the ends, if such is desired, would have been set out before the joints were cut, as in Exercise 3, and would now be carried out, the joint being taken apart for this purpose.

EXERCISE 5—HOUSING JOINT.—It is the belief of the writer that an unending succession of exercises in making joints over a long period results in a certain staleness on the part of the pupils, even though they attend only once a week, unless these exercises are incorporated in simple jobs or are interspersed with other working exercises. This opinion is held as a result of observation and experience but, of course, it is open to question, and its value depends entirely upon the type of lad being taught and the intensiveness of the course.

For these reasons the housing joint is introduced as early as this in the form shown in the diagram, and in certain cases it is suggested that the following four exercises should be taken as is most convenient in the circumstances and not necessarily as given here.

Another debatable point arises at this stage—as to the advisability or otherwise of introducing hardwood at an early time in the course. Again, this must rest with the teacher in the individual case but, provided that the stuff is selected in a reasonable manner for its mildness, there is no reason why the class should not be able to carry out the exercise shown in Japanese oak.

There is often a tendency to underestimate the powers and capabilities of selected groups of boys at this age. They are put into a metalwork shop and are expected to handle one of the most difficult tools—the file—on unresponsive and hard material. But the now fairly familiar operation of planing is regarded as being too difficult if hardwood is to be used.

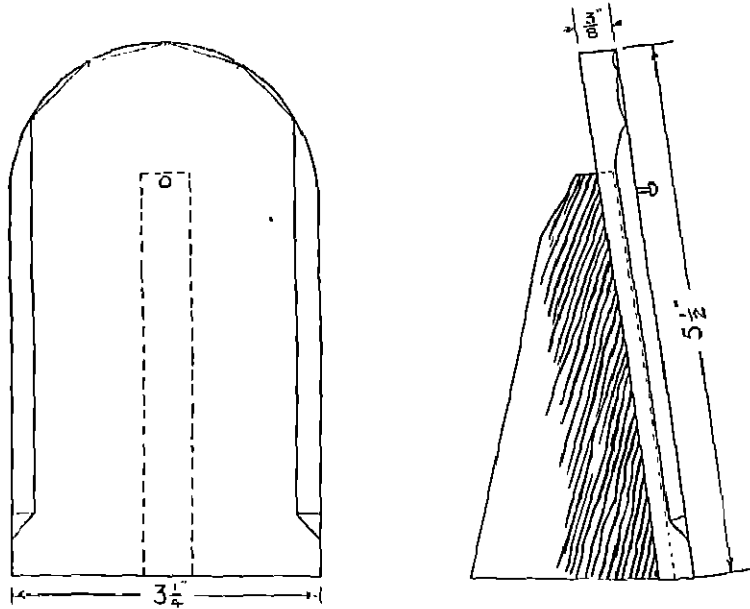
The reason for this is largely the undoubted difficulties that arise due to bluntness of the plane iron which causes the plane to jump, kick or jam and tear the surface, whereas the same plane would probably be satisfactory for some softwoods.

A little time spent beforehand in sharpening the irons, and a little care spent in setting them finer than for softwood, will do away with the hardwood bogey.

If it is felt that hardwood is definitely beyond the powers of any particular class, then American whitewood should be used. This wood works up very cleanly when any chamfering or shaping such as that shown has to be done. Other softwoods are useless for this purpose, as they are so difficult to clean up in places where glasspaper must not be used. Also, white-wood—Canary pine—takes a good stain and polish.

If it is possible to use the oak, it should not be stained and need not be polished beyond oiling or waxing.

The housed support is cut out in one piece with the front and planed up as one.



EXERCISE 5. HOUSING JOINT AS PART OF A WATCH STAND

The setting-out presents no difficulties beyond watching to see that the grain of the support runs as nearly as possible along its length.

In cutting the joint it will be found most helpful to leave the support end away from the end having the groove, but to mark the width of this by cutting off the larger portion of waste from the support end and, placing it in position, marking its thickness with two marks made by the knife. The correct thickness of stuff at the support end is then ensured, as the width of the groove and the extra wood on the length allows the job to be held down firmly on the bench while the housing is worked.

The two marks are gauged as lines by using the marking gauge; the end of the stopped groove is marked with a cut line by using the try square from the face edge; the wood is held with a G-cramp, a small piece of waste wood being inserted to protect the surface.

A $\frac{3}{4}$ in. (bare) firmer chisel is selected and the waste in the groove is removed by making a succession of cuts across the grain, at very short intervals, until the length has been covered. This waste is then pared out horizontally and an inch chisel is used vertically to pare the edges clean to the cut lines. For a short housing this method is quicker and easier than the sawing method.

Careful attention must be given to the corners to see that they are properly cleaned out, and to the strength of the blows given with the mallet in the first chopping of the waste, as in this thin stuff a careless boy may easily drive the chisel right through on the second cutting.

The support is now cut out, tested for a fit, and cleaned up at the edges with plane and chisel.

Finally, after practising on a piece of waste, the chamfers are cut. They are done with the firmer chisel, the work being held on edge in the vice and the chisel held firmly in the left fist with the edge of the palm resting on the wood to steady the hand. The right hand does the pushing, but the left hand pushes back against it while resting on the wood and also guides the cutting edge. The chisel is used bevel downwards for the curved ends of the chamfer, being turned so that the flat face can rest along the chamfer for the straight parts. These are cut first, the curves being cut in carefully to meet them. It will give the best results if a wide chisel is used for the whole operation.

After oiling or waxing, or staining and polishing if softwood is used, the end of a small glue brush is run along the edge of the support and the joint is closed, then left to dry. Very little glue is necessary if the joint fits. When set, a round-headed brass pin is tapped home, the support being held in the vice and a small hole made first with a suitable bradawl.

The base edges cannot be cleaned off after gluing up. They should be shot when the joint is finally fitted dry.

EXERCISE 6—DOVETAIL HALVING JOINT.—Usually the T-halving joint is made first, in which the full width of the stuff is taken right through the joint. As the full dovetail halving is made in the same way, apart from the sawing of the dovetail itself, the operations of both joints are combined in this exercise to save time. The repetition involved in the teaching of them separately is hardly necessary at this stage, as no new tools are introduced.

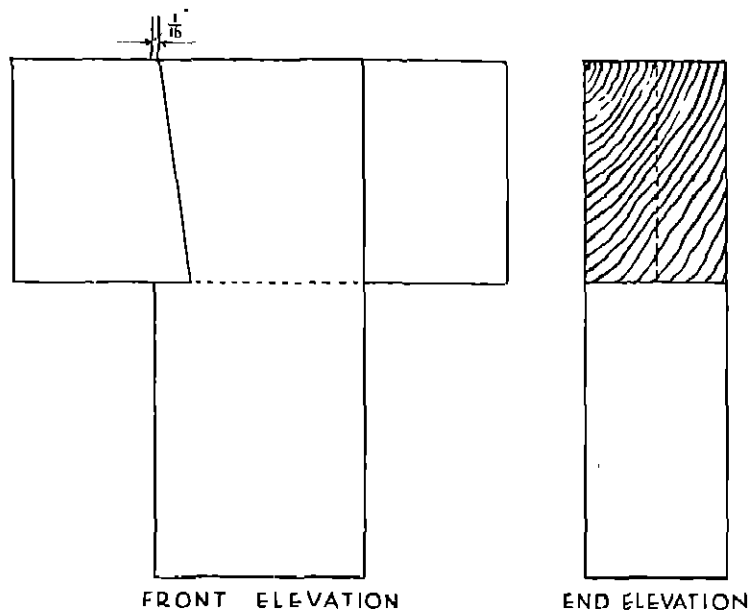
The stuff for the exercise is planed up in the one piece and is marked out as shown in the diagram. The waste has been removed from the dovetail end so that the gauge line may be carried round accurately.

Two face marks are necessary, both as a reminder when gauging and to ensure that the pupils become used to placing one on each separate member of any framing-up, thus bringing the face sides of any such job flush when glued up and minimising the need for subsequent cleaning off of the surfaces.

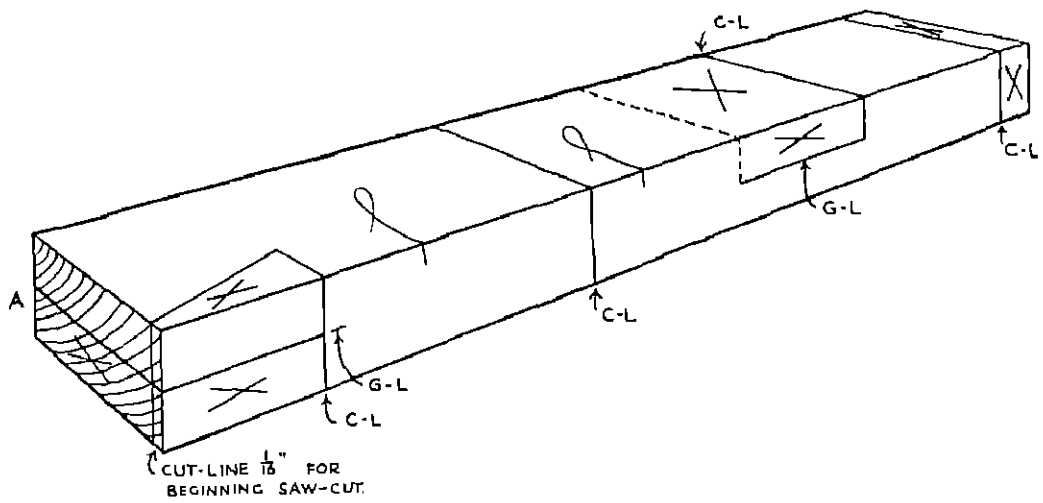
The waste and centre lines having been squared round, the centre point of the grooved member is marked with a pencil. Half the width of the other member is then marked to one side of this point with the marking knife, and this one shoulder line only is squared across the face and down each edge to just beyond halfway.

The width of the grooved member, plus a fraction of an inch, is now measured from the dovetail end, and the dovetail shoulder is marked and squared across the edge and is carried in also on the waste side.

To avoid having to start the saw on the very edge of the stuff, a gauge line is now run across the end, as shown, for the start of the dovetail. This is joined to the shoulder line to give the slope necessary, and this line may be in either pencil or cut line, depending upon



EXERCISE 6. DOVETAIL HALVING JOINT



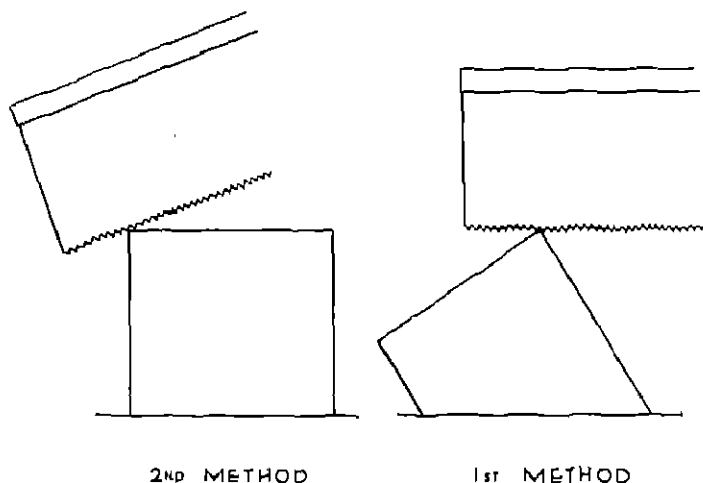
EXERCISE 6 (CONTINUED). METHOD OF SETTING-OUT THE JOINT

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the wood used, as some grains make it very awkward to put a cut line nearly in line with the grain.

The gauge is set to half the thickness of the stuff and the groove and dovetail gauged on both edges.

The wood is placed upright in the vice with the width across the vice, and the dovetail is sawn down. There are two common methods of doing this: in the first, the wood is sloped and held with the width along the vice, the saw cut being started on one corner; in the second the wood is placed as described first, and the cut is started in the normal way on the further edge. The writer believes that, for boys, the second method is much the easier, as once the saw is started and is lowered to the full width of the end, the cut acts as a guide to the saw and all the boy has to do is to saw straight down in the same way as for a shoulder. If the first method is used, from the moment the cut is begun he has to saw to two lines at once without the steadying guide of a wide cut that has been started already, and he finds it most difficult to gauge the correct plane of the saw.



EXERCISE 6 (CONTINUED). TWO METHODS OF BEGINNING A SAW CUT WITH THE GRAIN OF THE WOOD, AS FOR A TENON

This may seem to be a minor point, but as this is the boy's first experience of sawing with the grain across any considerable width of stuff, it is worth while to consider the added difficulty of the first method.

For very much the same reasons the waste is left on the dovetail until the slope has been sawn, which is the next step. A wider surface to guide and steady means a more accurate cut, and it is essential that all joints of this type are left after sawing. A chiselled joint is invariably a bad one.

The shoulder having been sawn in, on both faces, the stuff is cut in two and the dovetail is placed in position on the other member, the edge of the straight side lying on the cut line and the shoulder tight up against the edge of the wood. It is held firmly so, whilst a mark is made with the marking knife against both the inside and outside ends of the dovetail on the other member.

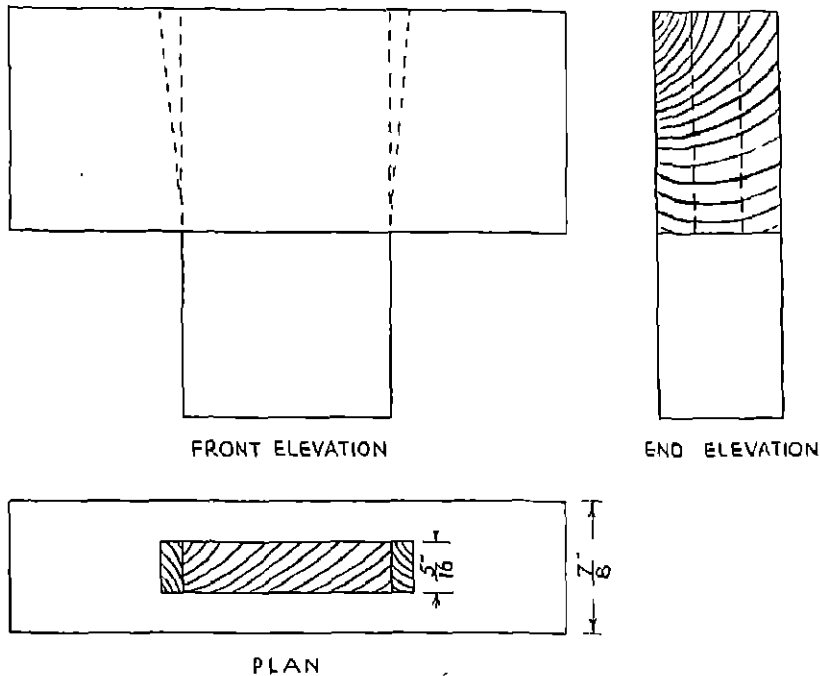
Removing the dovetail, these marks are joined by the second cut shoulder line now made and squared down to the gauge lines.

The shoulders are sawn in; the waste removed, working from both sides while the wood is held in the vice and with the widest chisel possible; the edges and floor cleaned out carefully, and the joint fitted.

The remaining waste is now sawn off; any smoothing of the faces is done with a sharp iron plane, and the slight waste on the end of the dovetail is removed by the same means. If the joint is a good one, the face side should remain untouched to show the face marks.

EXERCISE 7—MORTISE AND TENON JOINT.—A length of clean deal, 12 in. by 2 in. by 1 in., is planed up as before. The waste is marked off, and the centre line squared round.

The setting-out from this point is shown in the diagram. As in the last exercise, the width of the stuff is measured along the centre of the mortise end, on the face edge, but this time

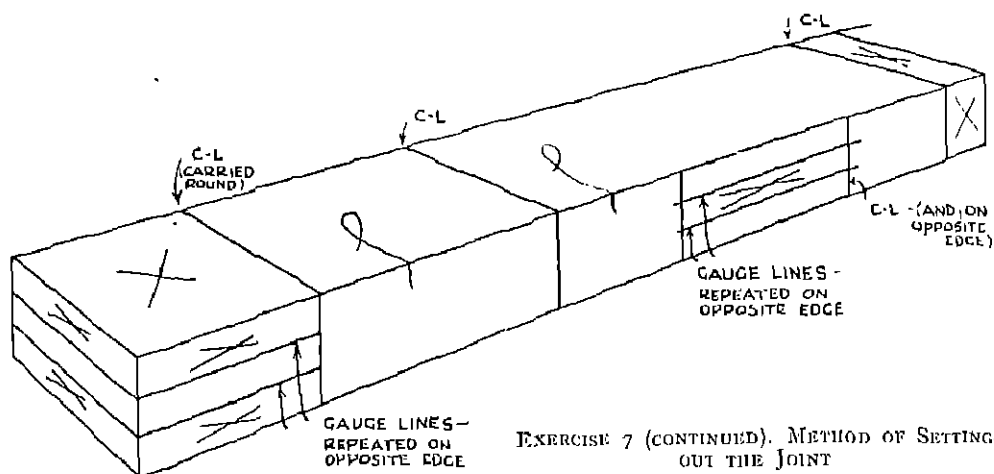


EXERCISE 7. MORTISE AND TENON JOINT

both cut lines are squared across this edge. The square is used to transfer the ends of these lines to the opposite edge of the face side, and they are then squared across the opposite edge itself.

The waste at the tenon end is cut off. The width of the stuff, plus a fraction of an inch for cleaning up, is measured back from that end, and the shoulder line is squared right round. This operation is usually done carelessly by boys, and the teacher should insist on the *squaring being done in the proper sequence*; namely: (1) using the square from the face edge, cut line across the face side; (2) from the face side, cut line across the face edge; (3) from the face edge, cut line across the other side; (4) from the face side, cut line across the other edge, when the lines should meet.

The mortise chisel nearest a third the thickness of the wood is now selected, usually the



EXERCISE 7 (CONTINUED). METHOD OF SETTING-OUT THE JOINT

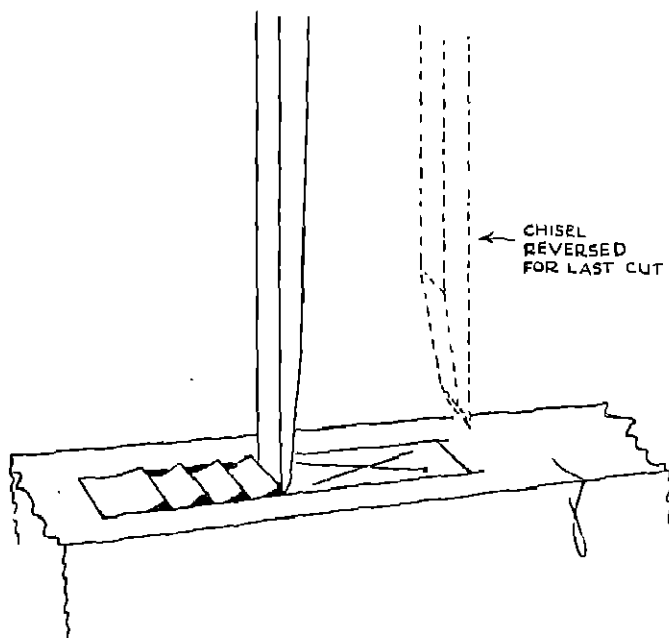
$\frac{1}{16}$ in. The class is shown how to set the gauge to the chisel to be used, and then how to set the stock to get the gauge lines evenly in the centre of the thickness.

The gauging is all done from the face side while the stuff is still in one length, and the same practice should be followed in framing-up several members.

The mortise is cut next, and in small stuff such as this, it is quicker and more accurate to cut it direct with the chisel than to bore a series of holes first and then trim up with a firmer chisel. The method is shown in the diagram, the cutting taking place from both edges until the waste is cleared. It only remains to pare the ends of the

mortise clean to the cut line, from both edges. The roughness of the walls resulting from this direct method of cutting assists the glue to hold firmly.

The need or advisability for wedging a single joint of this type at this stage is debatable. If it is desired to do so, the ends should be pared out now but the splay should not be taken right through, otherwise the wedge may be riding on the shoulder when it is driven home. On 2 in. stuff in softwood, $\frac{3}{8}$ in. is enough for the wedge. In hardwood it should be less.

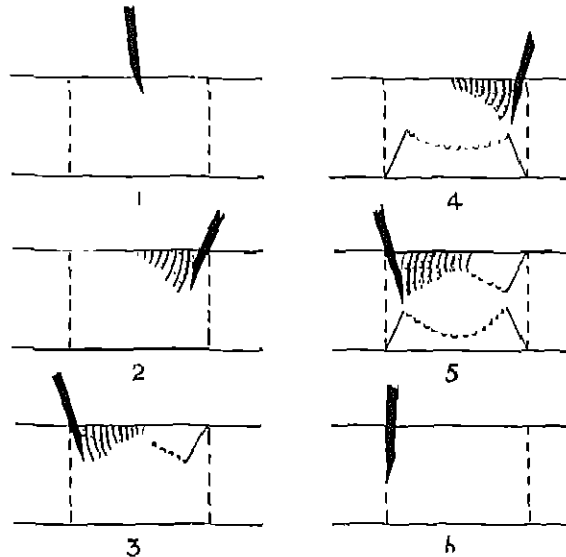


EXERCISE 7 (CONTINUED). METHOD OF CUTTING A SMALL MORTISE

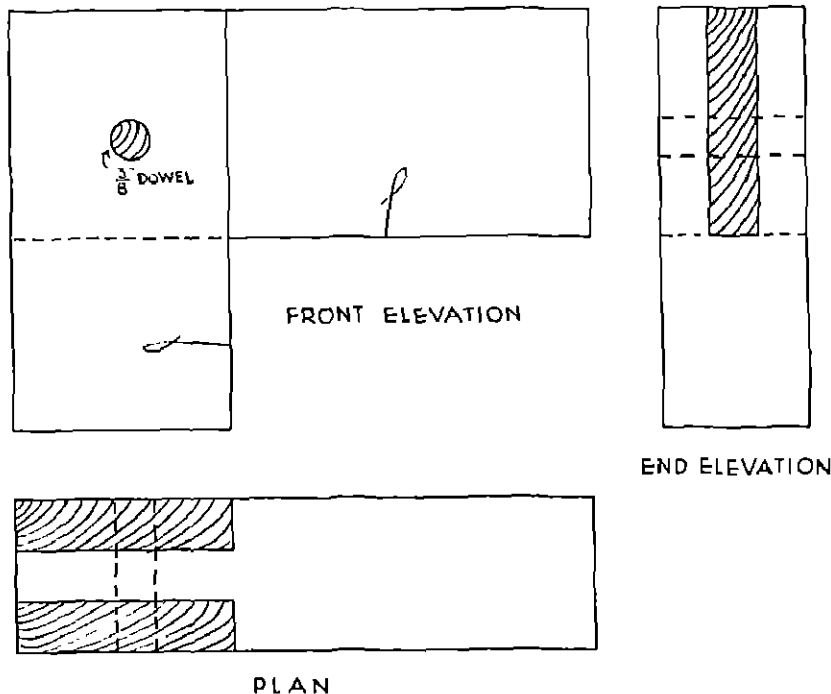
The tenon is sawn down next, care being taken to saw up to the gauge lines on the waste side and to finish to the shoulder line and not beyond it. The shoulders follow, after which the stuff is sawn through on the centre line and the joint fitted.

If not to be wedged, the exercise is cleaned up dry at once.

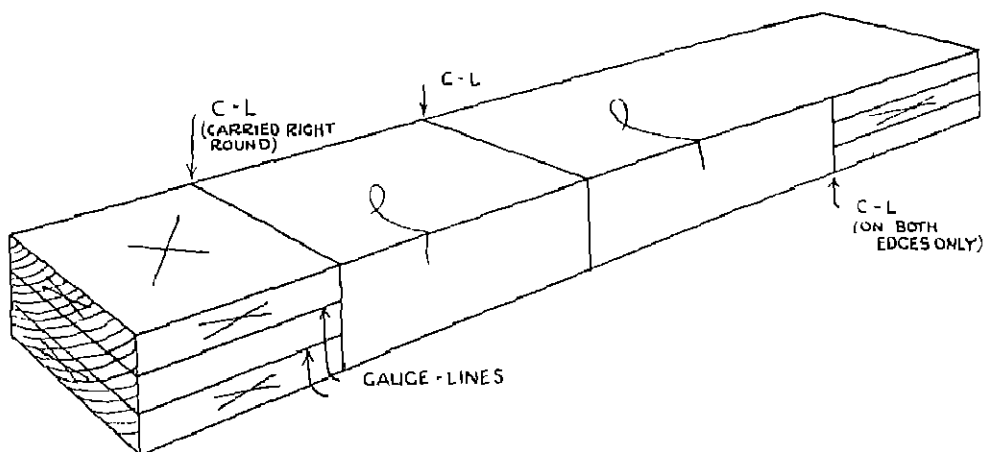
EXERCISE 8—BRIDLE JOINT.—Stuff of the same size is used as for the last exercise. The joint resembles the mortise and tenon, and the setting-out, shown in the diagram, is almost identical. It presents greater difficulties in the sawing, however, as each saw-cut must be quite accurate to show a good fit on both the outside faces of the joint. To do this without the necessity for any trimming of the surfaces with a chisel is a real test of the boys' ability to handle the saw.



EXERCISE 7 (CONTINUED). ALTERNATIVE METHOD OF CUTTING A SMALL MORTISE



EXERCISE 8. BRIDLE JOINT



EXERCISE 8 (CONTINUED). METHOD OF SETTING-OUT THE JOINT

The joint is a useful one for rough framing-up, for seat frames and similar work where an angle joint is essential. To give extra strength and security it is common to peg the finished joint with a hardwood dowel, as shown in the diagram. On stuff of the size used here, a $\frac{3}{8}$ in. dowel peg is large enough. It should be put in after the joint has been glued up and the glue set, the ends being cleaned off flush with the joint surfaces later.

EXERCISE 9—HAUNCHED MORTISE AND TENON JOINT WITH GROOVE.—This also being an angle joint, the mortise and tenon should each be set out on the opposite ends of the length of stuff as before.

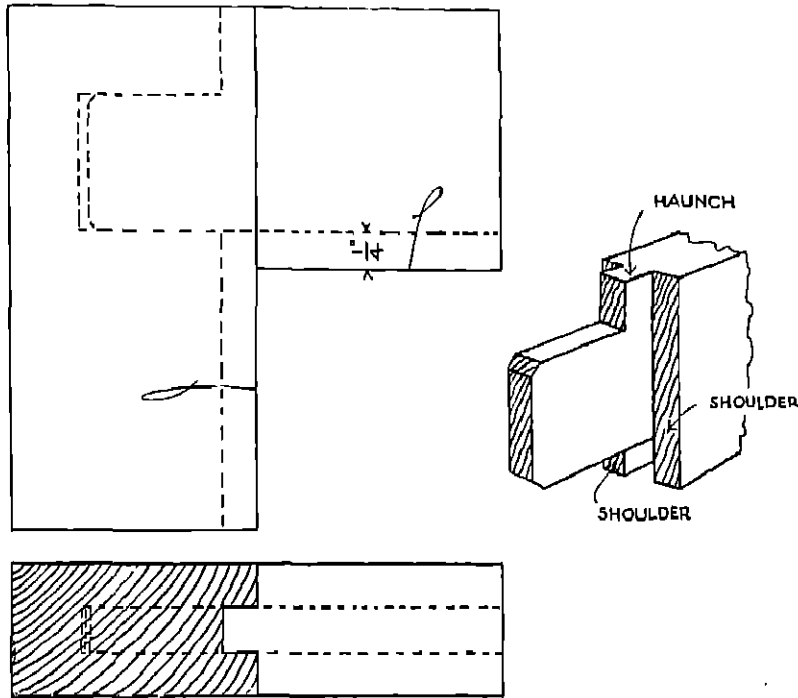
It should be so arranged that the thickness of the tenon (and therefore of the haunch) coincides with the width of the ploughed groove as shown in the diagram.

The joint is used for any framing, such as a door which has to contain a fixed panel of wood. Glass panels should be held in rebated door frames so that the panel can be removed in case of injury. The purpose of the haunch left as a part of the tenon is to fill the end of the groove beyond the mortise, giving a neat finish on the outside edge of the joint, and to assist in preventing any twisting of the tenon member due to a loose tenon.

The setting-out will be exactly the same as in Exercise 7, with the addition of the gauge lines on the inside or face edge being carried right along the length for the groove, and the extra gauge line across the end of the tenon, at right angles to it, for sawing down to the haunch. The only other difference is the advisability of leaving more waste than usual on the mortise end of the stuff, to be cut off after the joint is glued up.

In working, the greatest care is necessary to see that the proper sequence of operations is carried out, so that the mortise is cut first; then the tenon sawn down (the side waste being left on), and finally the groove ploughed and the remaining waste sawn off. Otherwise, a careless boy will suddenly find himself faced with the awkwardness of attempting to cut a mortise at the bottom of a groove from which all his marking-out lines have disappeared, and of sawing down a tenon with the groove walls carrying his saw inside the lines all the time. The plough or universal plane, whichever is used, should be sharp and carefully set, for it is a difficult tool for a boy to use for the first time. The ploughing of the groove makes it all the more necessary to see that the stuff is left in the one length until the last possible moment.

It will be noticed that all these joint exercises are so marked out, that when the joint



EXERCISE 9. HAUNCHED MORTISE AND TENON JOINT

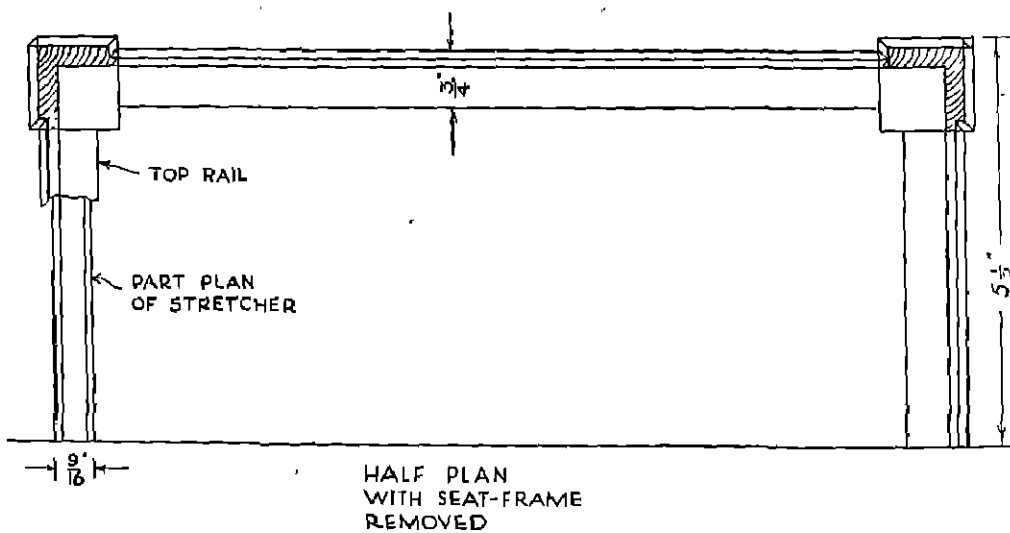
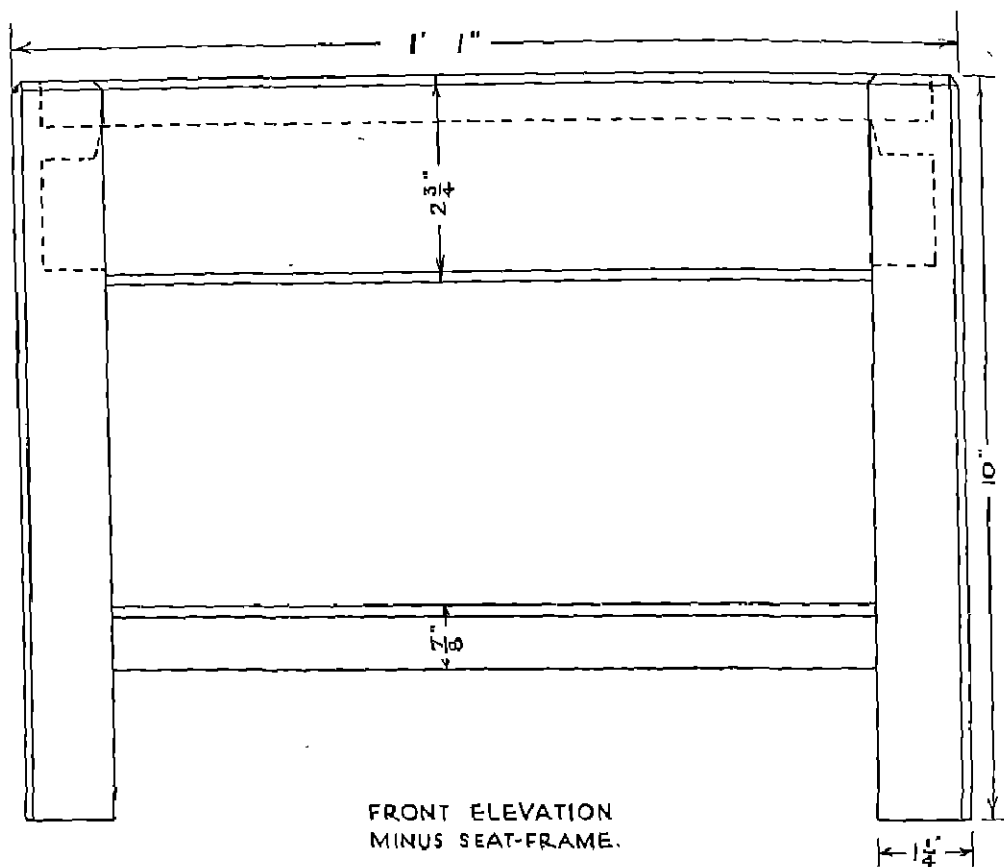
is fitted, the face edges always come to the inside of the framing. Too much importance cannot be given to this point of the teaching, as it ensures squareness of the framing. The face edge is the one which is, presumably, guaranteed as tested and square, and all the marking out and gauging have been done on or from it; if these edges are kept to the inside it is fairly certain that the shoulders will fit properly, and, what is more important still, that the framing will not be "in winding" or twisted, as this is a fault most difficult to rectify.

EXERCISE 10—FRAMED STOOL.—"A" and "B" plus group only.) This provides the first exercise in framing-up, repetition work and assembling of a constructional job, along with the method of cutting a rebate. The particular design shown is restricted to the top groups, as the rebate and the cutting of the fine chamfers may be beyond the powers of the other groups at this stage, a good clean finish being necessary for this design to look its best. If the group system is not in operation, it is suggested that the design next following be substituted, and this one added to the list of jobs for individual work later.

The legs are planed up first, from $1\frac{3}{4}$ in. squares, rough. Oak is used, preferably a mild variety such as Japanese. Face sides and edges are tested very carefully, as these will be the faces containing the mortise and tenon joints.

Seat rails and stretchers are planed next. Although of different thickness they are the same length between shoulder lines. As soon as the planing is completed, the four longer members are placed side by side in the vice, face edges uppermost, and the shoulder-lines are squared across all four at once. If squareness and accuracy are to be obtained, it is essential that shoulder lines, and all similar members in any framing-up, are marked for length in this way and not by separate measurements.

The two end seat rails and the end stretchers are now marked in the same way.



EXERCISE 10. FRAMED STOOL

These cut lines are now squared across the face sides separately on each member, and then carried round as usual.

Next, the four legs are placed together, face edges uppermost, and cut lines are squared wholly or partly across for the extreme ends and position of the mortises. Another line is squared for the depth of the rebate.

Separating them, these lines are squared to the face sides as required. All joints are lettered or numbered on each member.

The chisel is selected next; the mortise gauge set to it; the stock adjusted to include both the distance the rail is set in from the inner edge of the leg, and the inside shoulder width, to allow the outside face of the rail to stand in about $\frac{1}{8}$ in. from the leg; and the mortises are all gauged for the seat rails from face edge and face side.

The seat rails are sawn to final length and the tenons gauged while the gauge spurs remain unaltered, the stock, of course, being adjusted to include only the inner shoulder.

The stuff for the stretchers is thinner, and the gauge is reset before setting out these mortises in the same way to bring them centrally on the leg faces. Altering the stock again the tenons on the stretchers follow.

All joints are thus marked out before anything else is done, and this is the invariable practice that should be followed.

A marking gauge may now be set to the depth allowed for the rebate, and this line is run along the inner faces of the seat rails. Then the line on the top edges for the width of the rebate is gauged.

The mortises are now cut in the usual way, being tested for depth with the end of a steel rule as they proceed, or a bit of waste marked to act as a gauge.

Next, sawing down the sides of the tenons and the inner shoulders only, the waste is left on until the rebates have been cut, thus affording more guidance for the plane.

There are two ways of cutting a through rebate, which depends upon the type of plane being used. If it is a universal plane, the thing is done straight away without any trouble beyond the setting of the plane correctly. If an old-fashioned wood rebate plane has to be used, the following method is advisable at this early stage, as this is a difficult tool for boys to use for the first time. The initials refer to the diagram on page 326:

(A) Waste planed off nearly to gauge line with jack plane and smoother to finish if stuff is awkward.

(B) Small step taken out with 1 in. chisel into gauge line, working at right angles to line. This is to give a start to the planing without so much danger of the plane sliding across the line.

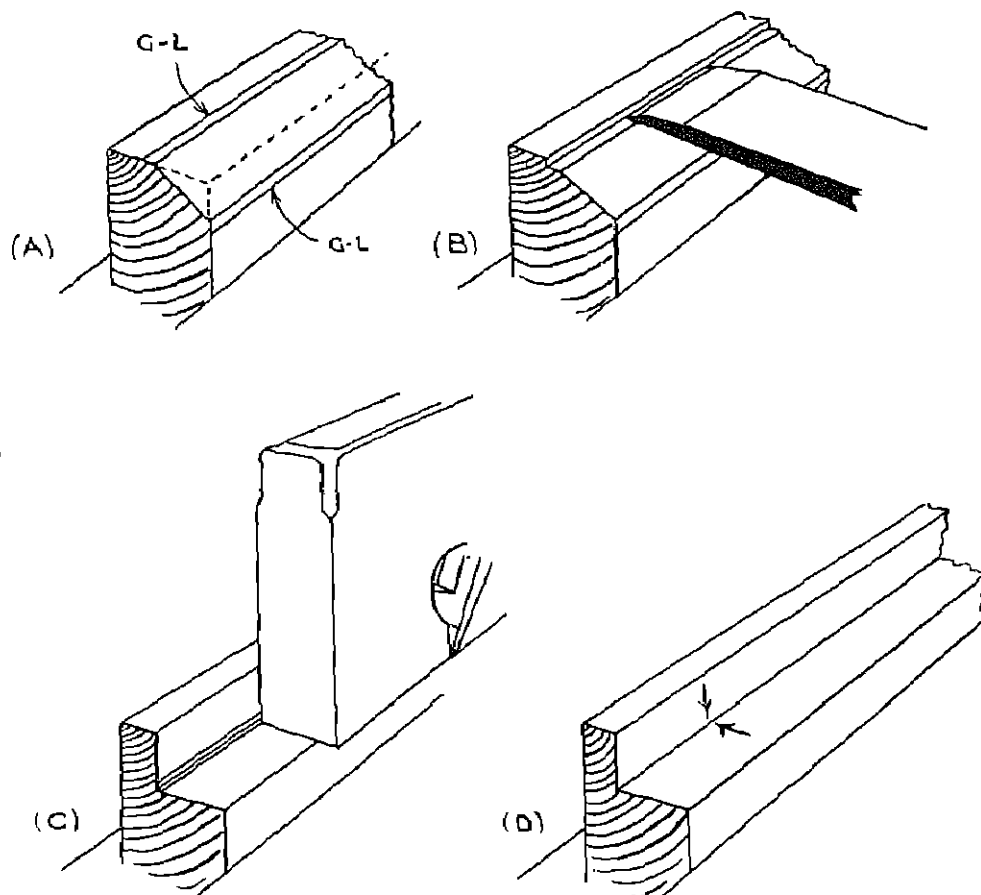
(C) Rebate planed down square to gauge line.

(D) Corner cleaned out with wide chisel if necessary. It is almost invariably necessary to do this, as the plane tends to work away from the wall of the rebate as it cuts deeper. If the boys are allowed to turn the plane on its side to trim this wall, they are liable to go beyond the top gauge line, and even then the inner corner will not be clean cut.

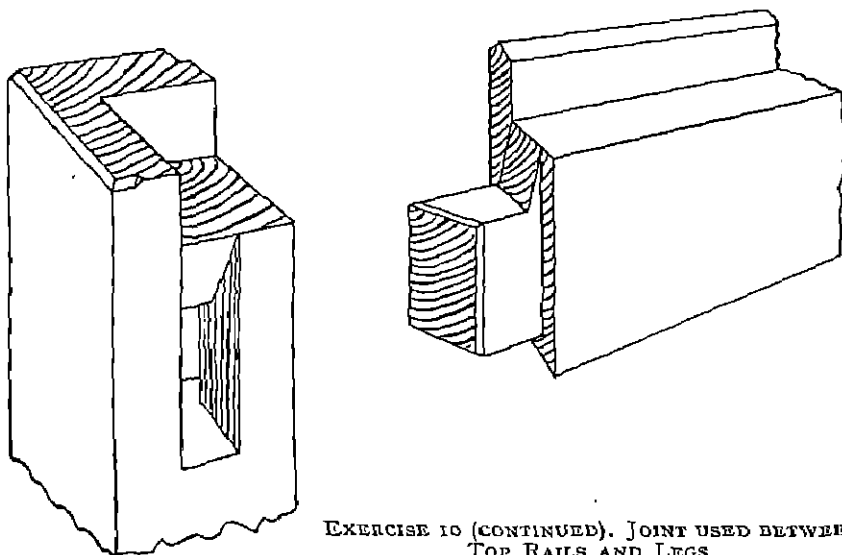
The side waste is now sawn off the tenons, and the outside waste is marked on them from the gauge line previously run over the ends.

The splay for the haunch is cut in to the mortises before the rebate corner is taken out from the legs. This follows by sawing and paring, and then the joints are fitted, the haunches last of all. These are made on the splay so that they may have the maximum effect while reducing the strength of wood above by the necessary minimum.

The ends of the stool are fitted first, and separately, whilst dry. They are cramped up, tested, and fitted with seat rail and stretcher in each case. When correct, they are taken apart and the chamfer on the under edge of the seat rails is planed, as well as those on the stretchers. The ends are then glued up.

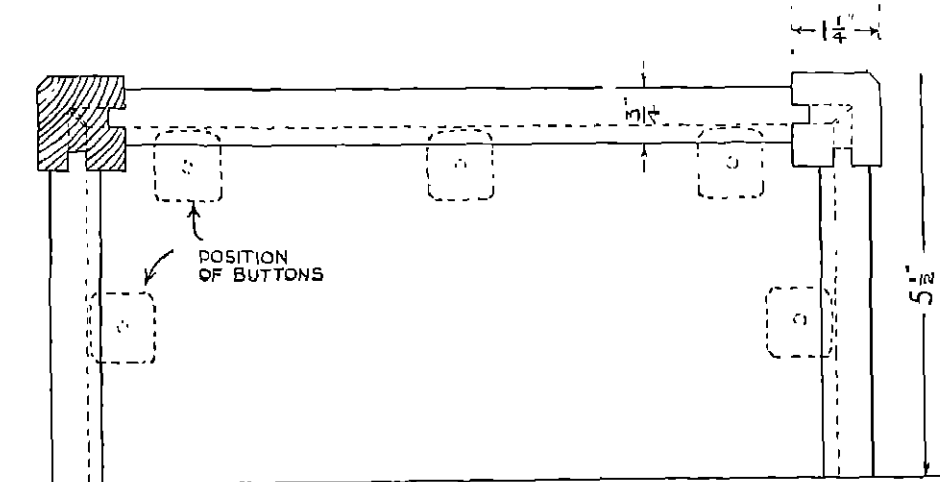
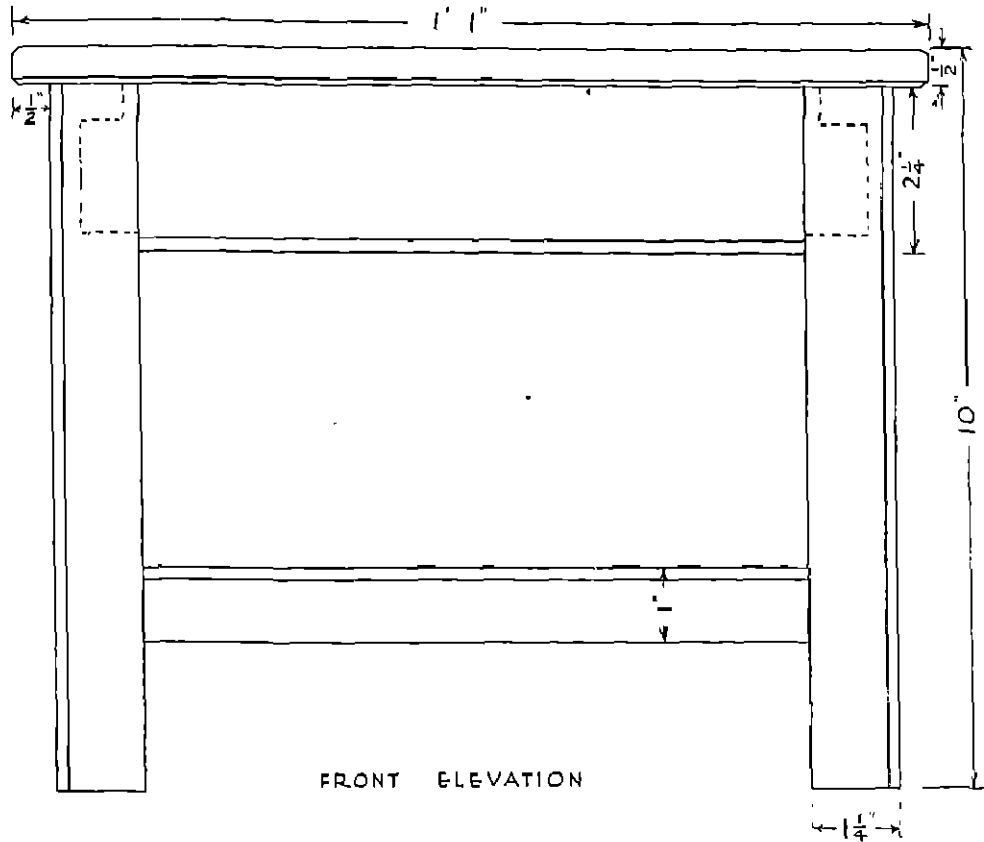


EXERCISE 10 (CONTINUED). METHOD OF CUTTING THE REBATES
A—D. The various stages of cutting.



EXERCISE 10 (CONTINUED). JOINT USED BETWEEN
TOP RAILS AND LEGS

Later, the front and back rails and stretchers are glued after fitting dry and the chamfers have been cut as on the ends. The job is tested for squareness and left in the cramps. Any surplus glue should be removed before it sets.



HALF PLAN WITH SEAT REMOVED
EXERCISE 10 ("C" GROUP). FRAMED STOOL

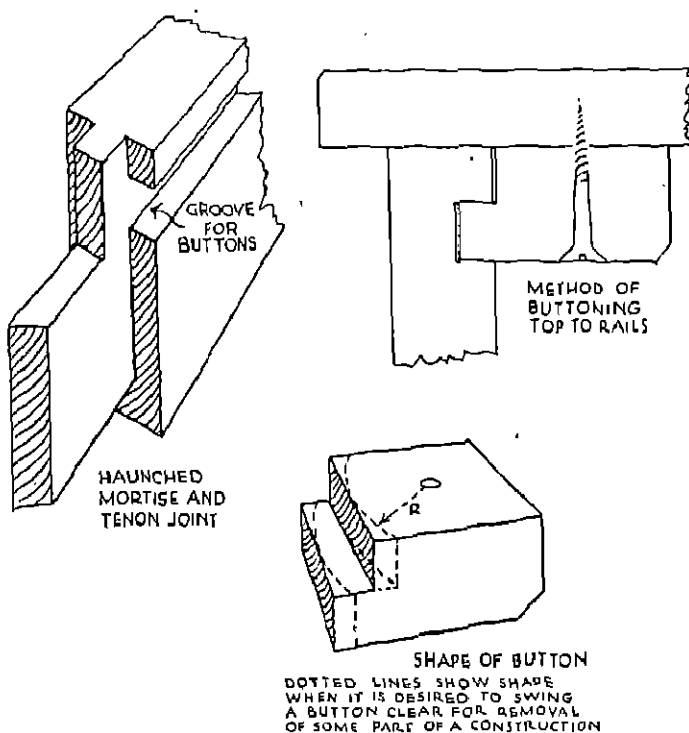
Finally, after the cramps are removed, pencil lines are run round the upper outside edges for the chamfers, and these are cut with a wide chisel, masons' mitres being used at the inner corners, as shown.

This job in oak is best left a natural colour and oiled for a good finish, or waxed. The seat frame may be made in birch or whitewood, using doweled or bridle joints; the latter pegged.

EXERCISE 10—FRAMED STOOL.—("C" group.) This shows an alternative design of simpler construction which may be substituted for the more backward groups, or in place of the other job for the whole class.

The procedure as to setting-out and working is exactly the same as in the former example, except for the ploughing of the groove to take the buttons by which the top is held and the chiselling of the short groove for the square haunch on the tenons.

The ploughing, using the universal plane, is a much simpler matter than the cutting of a rebate, and the haunches are easier to fit. The introduction of screwing (using brass countersunk head-screws in oak) makes this a useful exercise. The most difficult part of the whole job is the cleaning off of the top edges flush with the ends of the legs to get the top to "sit down" properly on the framing. As much of this should be done as possible



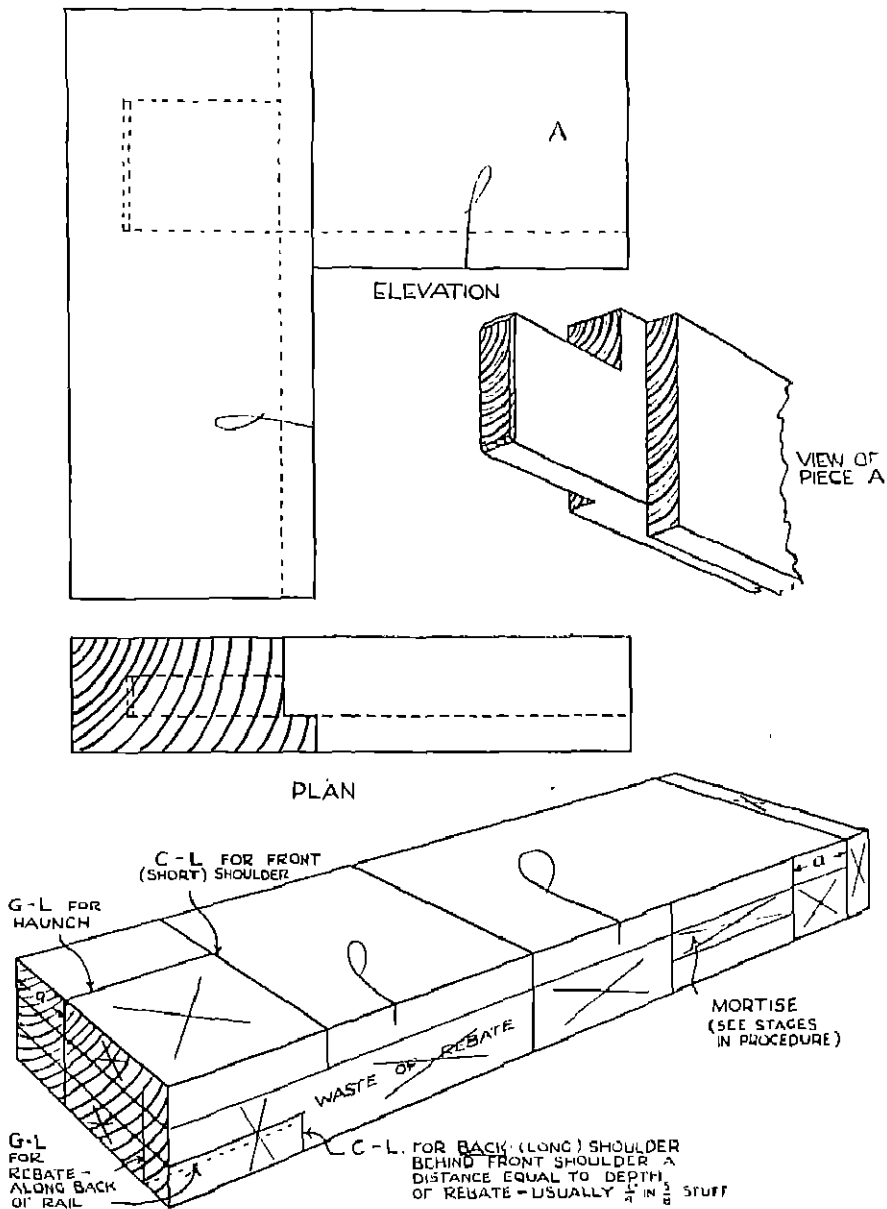
EXERCISE 10 (CONTINUED). FRAMED STOOL ("C" GROUP)—DETAILS OF CONSTRUCTION

before gluing up takes place, the ends being done and fitted dry to see that they are flush, and the sides also before being glued in.

The buttons are best made from one strip of stuff cut cross-grained *after* being planed to thickness as a larger piece. Then the step can be sawn out as a rebate from the whole length at once, cleaned up, and the individual buttons sawn off finally. The clearance holes for the screws in the buttons should be bored and countersunk before the buttons are sawn off.

If made in oak, the finish is the same as for the other design, but if in softwood, the stool should be either painted with colour enamel such as *Belco*, or stained and polished. Varnish stain should on no account be used, as it has a most unsatisfactory and unpleasantly sticky finish.

EXERCISE II—LONG-AND-SHORT SHOULDER MORTISE AND TENON JOINT WITH REBATE.—This joint is one of the most useful and commonly employed constructions in the school workshop. The great advantage it possesses over the ordinary mortise and tenon is the inclusion of the rebate, making it an easy matter to remove any kind of panel from the door or frame in which the joint is used. Beginners at first find it



EXERCISE II. LONG-AND-SHORT SHOULDER MORTISE AND TENON JOINT WITH REBATE

a confusing joint to set out, but if they have been taught to mark out systematically it presents no real difficulties.

The stuff being planed up, the waste and centre lines are marked off as usual. The length of the tenon is marked off from the left-hand end and the cut line for the front or short shoulder is squared across from the face edge.

The depth of the rebate—usually $\frac{1}{2}$ in.—is set forward from that line, on the face edge, and this is squared round to the other side for the back or long shoulder, as shown in the diagram.

Allowance being made for the haunch (a) from the width of the stuff, the mortise is set off on the other end of the length as shown, the waste again being left on.

The tenon will be, as usual, approximately one-third the thickness of the stuff according to the chisel to be used, but it may not necessarily be in the centre of the thickness as, with a rebate to consider, the wall must coincide with the front shoulder of the joint.

Setting the gauge, the tenon, mortise and rebate are all gauged at once on the face edge, the gauging being carried round the end of the tenon to the shoulder lines as before. It will be noticed that this brings all the face edges inwards on any framing-up, a point already dealt with in an earlier exercise, but most necessary here.

The depth of the haunch is now gauged, and the shoulder lines squared in to the gauge lines. The rebate depth is gauged on the back.

The mortise is cut; the tenon sawn down and the waste left on, and the rebate cut, in that order.

The side waste is removed from the tenon. The haunch is sawn down and the waste removed. The piece is cut in two and the joint is fitted.

EXERCISE 12—MIRROR FRAME OR NOTICE BOARD WITH REBATE.—The previous exercise having been worked, the same joint is employed in this frame.

The shoulder widths vary, however, and the boys obtain immediate practice in the setting-out of pairs of members. A certain amount of decoration is also included.

The two upright members—the stiles—are best planed up in one piece of double width to ensure an even thickness. The two shorter cross members—the rails—are done in the same way. Both lengths are then sawn down the centre and, the outside edges already having been planed as the face edges, the remaining edge is gauged for width and planed up.

The stiles are now placed together in the vice, face edges uppermost, and the positions of the mortises marked, allowances being made for the haunches at each end and for the amount ~~taken off~~ the width of the rails by the rebate at the inner ends of the mortises.

The rails are cut to length over-all, including tenons. They are placed together, face edges uppermost, and the front and back shoulder lines marked on these edges. Taken apart, the shoulder lines are squared round. Haunches are gauged between them.

Mortises, tenons and rebates are next gauged, and then, with the marking gauge, the depth of the rebate is gauged along the back of each member, as before.

From this point the order of procedure must always be maintained as follows:

1. Cut mortises all in succession.
2. Saw down side waste of tenons all in succession.
3. Cut all four rebates and clean out.
4. Saw in side shoulders.
5. Saw down haunches to shoulders.
6. Saw in edge shoulders.
7. Fit, and number or letter, all joints (to avoid confusion in gluing up).

The frame is tested in the cramps, dry, to see that it is square; that all shoulders, back and front, are fitting, and that it is not twisted—in winding—as often happens if a mortise has not been cut in the square with the stuff, or if a tenon has been sawn on a slight slope.

If a shoulder will not fit up properly, but is standing away on one side, it is best not to touch the shoulder—chiselling it away means a bad joint and is a wrong practice—but to take a shaving at a time from the floor of the rebate until the joint fits, or from the inner edge of the frame as necessary, care being taken in the latter case to adjust the rebate at the other end of the member correspondingly, to avoid throwing the frame out of square.

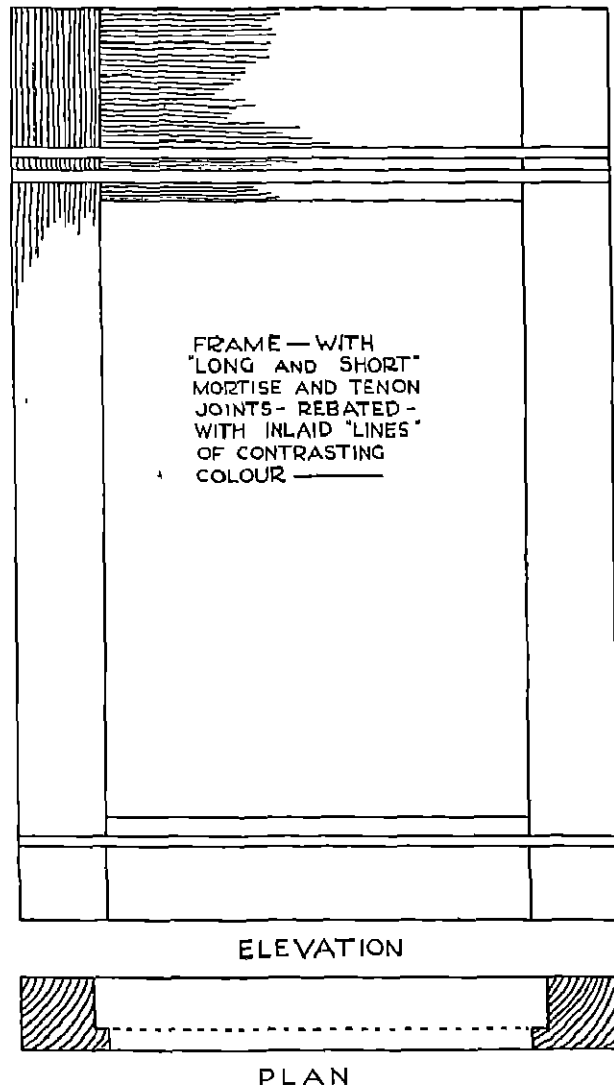
When the mortises are being cut, it is safest to guard against their running off the square by making the boy stand close to the bench well back behind the stuff, so that his eyes are right behind the chisel held at arm's length. In this way he can see that the chisel is upright. The usual tendency is to stand at the side of the chisel and practically right over it, with the result that it is unwittingly pulled sideways towards himself.

When properly fitted and tested, the frame is glued up and left in the cramps. Later, any surface cleaning up is done, and the job is ready for the decoration.

In the example shown, two sycamore lines (on walnut), or black walnut lines (on oak), are inlaid across the top rail and are carried out to the edges of the stiles. One line is inlaid across the bottom rail.

These lines form a suitable decoration, giving a note of contrast and harmonising with the plain rectangular edges of the frame. They are inlaid by means of a scratch stock and cutter used with the grain and across it, the exact width of the line itself having been gauged in first. The gauging should be done with a cutting gauge, the cutter being reversed as required for each series of inside and outside lines. Needless to say, the outer edges of the frame have already been cleaned up true.

The cutter projects from the scratch stock just a fraction under the thickness of the line.



EXERCISE 12. MIRROR FRAME WITH REBATE

When the grooves are scratched out, the line is glued into place, being run in with the pane of a hammer.

After the glue has set, the lines are scraped off flush with the surface of the frame, and trimmed to length flush with the edges.

If a wood panel is to fit the frame, it should be held in place with a narrow bead, the rounded edge to the back of the frame, which is pinned and very lightly glued into place, the corners being mitred.

A thick mirror plate is best put in with a narrow bead pinned in the rebate and cleaned off flush with the back of the frame. Then a plywood sheet is cut to overlap the inner edges by about $\frac{1}{4}$ in., its edges are quarter-rounded, and it is pinned to the frame, holding bead and mirror securely in place.

Wax, or French polish, is the best finish for this job.

EXERCISE 13—THROUGH DOVETAIL JOINT.—This joint, regarded with awe by the beginner, is really a fairly simple one to make successfully providing attention is given to (1) correct stance in sawing, and (2) correct vertical paring to a given shoulder line.

This joint is used so commonly in all constructions that it is essential that the class shall master it as soon as possible. Not only strong as a joint, it is very decorative when used in many designs in oak, either normally as here, or by grouping the pins, alternating their depth, or allowing them to project beyond the surface of the dovetails.

The stuff is planed and both ends squared dead true with the face side and face edge.

The thickness of the stuff is taken on a marking gauge and a mark only made at the opposite end on the face side. The shoulder line is squared across from this mark in the usual way and not gauged from the end, as the gauge line may not be clean and the end may not be exactly square. This state is repeated for the other end.

The dovetails are next set out on the right-hand end of the stuff. The method is shown in the diagram, the end shoulders being marked in first about equal to the thickness of the stuff. This leaves a certain distance for the dovetails and intervening whole pins. To avoid confusion and mistakes any convenient unit of measurement is chosen for dovetail and pin and is set off alternatively along the pencil line drawn at any suitable angle from the beginning of the first tail, as shown. When the required number is set off, the last point is joined to the end of the last tail. Parallels are drawn and the shoulder line is divided up, as shown.

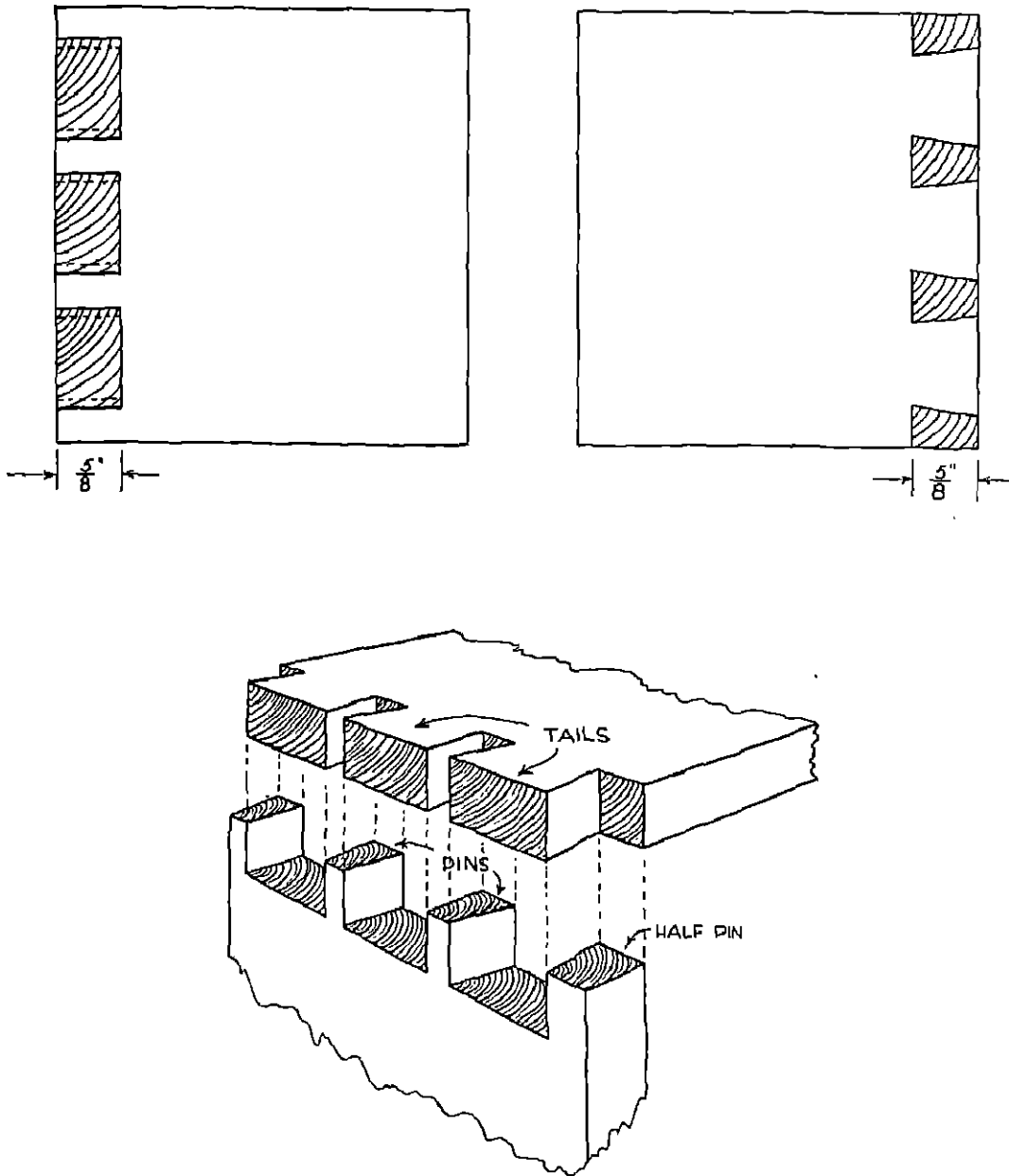
The sliding bevel is set to the requisite slope of 1 in 6 for softwoods or 1 in 8 for hardwoods, and the marks on the shoulder line are run as cut lines to the end of the stuff, squared across and run down to the other shoulder line with the bevel again.

The wood is now put in the vice so that the cut lines marking one side of the dovetails are upright. These are sawn down carefully square across the edge of the end. They should be finished accurately to the shoulder lines for no chiselling of these sides of the dovetails or the pins should be done after sawing.

Next, the wood is sloped the other way and the other side of the dovetails sawn down, all in succession.

A divergence of opinion exists as to the next stage to be followed. Some, who prefer an old "trade" method, insist on the wood being sawn in two, the pin portion being put in the vice, and tail portion placed on it in position—supported on a plane—and the saw cuts transferred to the end of the pin portion by the nose of the same saw being placed in the cuts and sharply withdrawn. The resulting scratches are then used for sawing the pins.

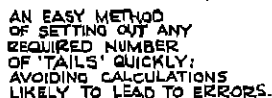
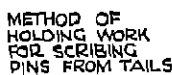
The writer contends that this method is too awkward for boys. It requires no slight degree of skill to hold the tail piece firmly without it slipping at all while the saw is put in a number of slanting cuts and withdrawn sharply enough to give a clear mark. In any



EXERCISE 13. THROUGH DOVETAIL JOINT

case the mark so made is not fine and sharp like a cut line, but is a broad scratch needing experience as a guide to know where to cut with exactness.

The more commonsense and accurate method is to chop out the waste between the tails first and finish the shoulders by vertical paring on the bench hook; then to place the tail piece in position, as shown, and to scribe lines along the sides of the tails with a knife or



Another common fault, which causes bad fitting of drawers, etc., occurs here. The necessary amount is cleaned off only from the joint area, or a blunt plane is allowed to jump the end grain so that the end of each piece is sharply rounded off at the joint edge. Care should be taken to see that all shavings are carried well along the length of each piece.

sharp scribe point. These are carried down to the shoulder line on the face side, when the pin piece may be placed upright in the vice and the pins sawn down. The waste is removed in the same way, when the joint should fit without any difficulty.

The commonest fault in working is the incorrect paring of the shoulders on both pieces, the major portion of the shoulder being flat and fairly true but the extreme edges being rounded off to the cut line. However slight this rounding—due usually to a blunt chisel—

may be, the shoulders will be standing away instead of fitting snugly thus causing a bad joint all round.

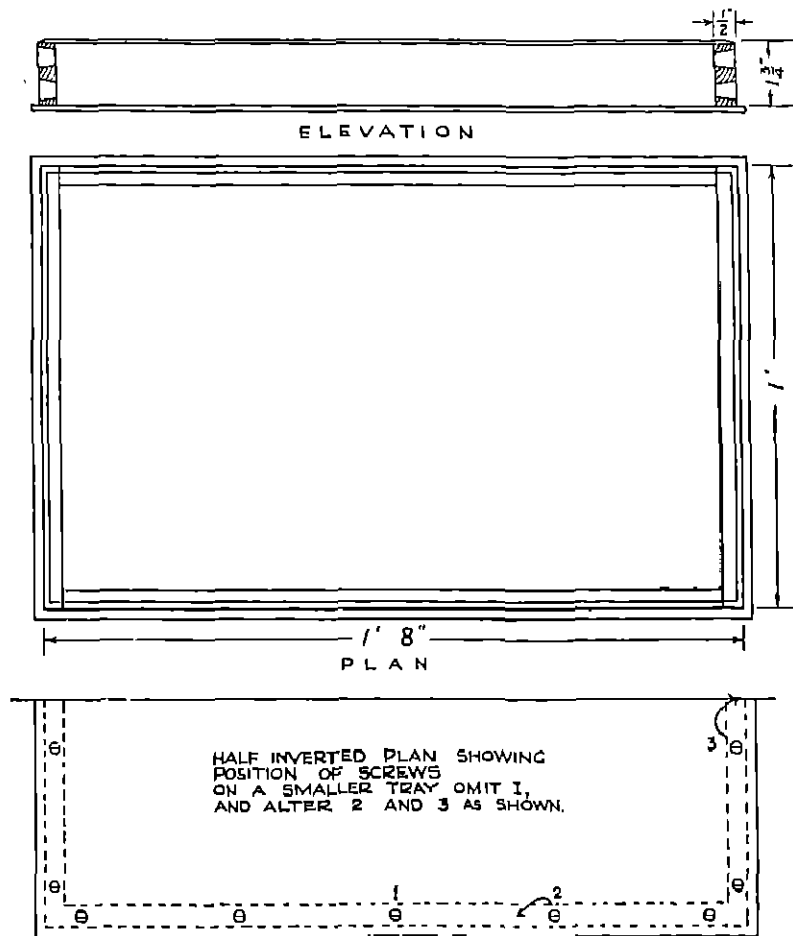
A fraction is added on to the thickness with the gauge when first marking the shoulder lines, so that when the joint is glued up the end grain on each piece may be shaved off to clean up the joint finally. Nothing should have to be removed from the thickness of the stuff itself.

The joint is so marked out and fitted that the face sides come inside and not outside.

The cleaning up with a smoothing plane should take place while the joint is held firmly in the vice, the direction of planing being along the length of each piece from the joint edge.

EXERCISE 14—DOVETAILED TRAY.—The end rails of the tray may be shaped to include a handle of the ordinary type cut from the end, should this be desired; or a finger-grip handle may be screwed on to the side of each end rail. Such additions however are of secondary importance as compared with the framing-up of the tray.

The four sides are planed up and the ends shot clean. As in the case of the mirror frame the opposite members are placed together in the vice, face edges uppermost, and the shoulder



EXERCISE 14. DOVETAILED TRAY

lines squared across. Taken apart the shoulders are squared right round, except on the pin pieces where they are needed only on the face side and back. This distinction should be made as there are two half-pins on the outside edges of each of these members and cut lines should not be made where they are unnecessary; also, their presence may lead to the accidental sawing off of these half-pins.

The stages in procedure are exactly the same as for the last exercise, but all the thicknesses should be marked at once, all the dovetails set out together, and each succeeding operation carried throughout all four joints at the same time until the final fitting is done. The common

tendency to make and finish one corner at a time involves a great loss of accuracy and much useless repetition of gauge setting, etc.

The joints should be fitted and the bottom edges cleaned off as nearly flush as is possible before gluing up.

A strong three-ply base may be used, or a solid one of about $\frac{3}{8}$ in. thickness. It is cleaned up, squared to size, and any chamfering or rounding of the edges completed. Then it is placed in position on the tray and small pencil marks close against the tray sides are made at the inside and outside of each corner. The base is removed and a pencil line is ruled round on a centre line between these marks. Clearance holes are bored along this line from the upper surface of the base, and then countersunk from underneath, as indicated in the diagram.

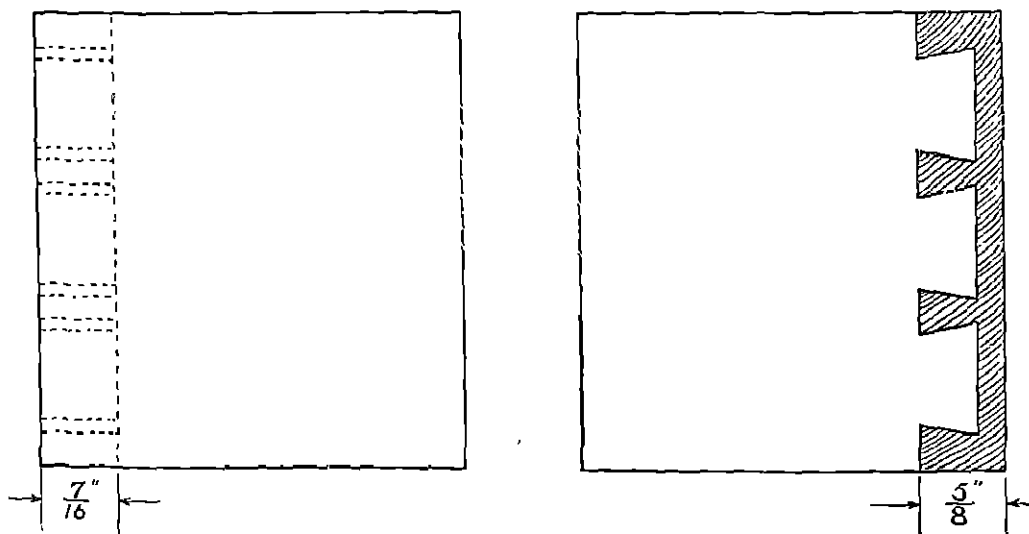
The base is again placed in position, the position being checked by the pencil marks. It is firmly held by wooden handscrews at each corner while the screws are put in at the centre of each side, using a bradawl for the screw holes in the sides. Working outwards from these the remaining screws are added, all being left with the slots finishing the same way.

As it is awkward to stain, fill and/or polish right up to the inner edges; the base is best removed for this purpose and replaced after polishing.

EXERCISE 15—LAP DOVETAIL JOINT.—One of the commonest joints used in carcass constructions, this forms the final exercise in the fixed course for all groups.

Its chief test of skill lies in the correct paring of the pin sockets, as the least amount of waste left in the corners will prevent the joint from fitting. Also, if the socket walls are not pared in at right angles, or are very slightly undercut, the shoulders and ends of the tails will stand away.

The first stages are the same as for the through joint except for the omission of the outside shoulder line which is replaced by the gauge line across the end of the pins, set at the length of the tails from the face side. This necessitates the accurate squaring and shooting of the



EXERCISE 15. LAP DOVETAIL JOINT

ends of the members, both tail and pin pieces, which are usually of different thickness, as for example at the front corner of a drawer.

When the tails are being set out for this joint they should be set closer together than for the through dovetail, the pins varying in size according to whether they are for a carcass side or a drawer front. In the latter case, if for a delicate job in hardwood, they are made very fine.

After the gauging the tails are set out and cut and the waste cleared. The marking of the pins takes place as before, then the pin piece is placed in the vice and they are sawn down as far as possible from shoulder to gauge line.

This piece is placed on a bench hook and held firmly with a G-cramp with the ends of the pins near the edge of the bench, and then the waste is chopped out roughly by using vertical and horizontal cuts. It is advisable to put the work on the bench and not to do this in the vice as there must be adequate support for the thin back wall of the sockets while the waste is being cleared.

Without moving the work the sockets are pared out cleanly and finished. When removed the joint should fit without any trouble.

At this stage, and in the making of the through dovetail, a time limit adjusted to suit their capabilities should be set for the boys doing the job. It acts as a spur to them and also as an indication to the teacher of the extent to which the habitual portions of the work have been assimilated. The time from start to finish allowed for this exercise to the "A" group might be set at forty minutes. If work is stopped at that time it is possible to form a good estimate of each boy's ability based on the course taken. It is probable that one or two will have finished the exercise except for the cleaning up.

The two important things that it is necessary to test at this stage are:—(1) the amount of skill attained in the habit-forming tool operations and manipulation; and (2) the extent of the boys' ability to think one stage ahead of the actual operation in progress at the moment, thereby saving valuable time in many small ways and avoiding mistakes.

A speed test is the only sure way of doing this, and if the suggestion to use this exercise is not adopted, it is advisable to hold a separate and additional test based upon the course work up to this point, before going on to the intermediate course.

THE INTERMEDIATE COURSE

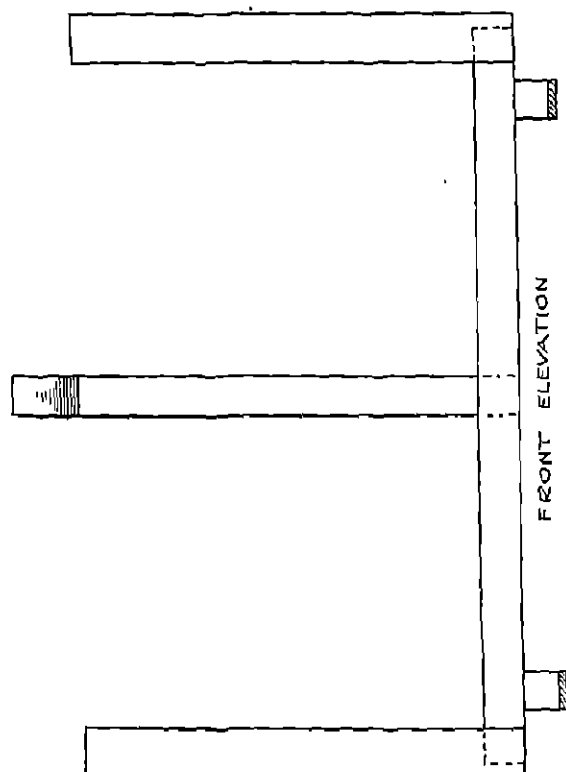
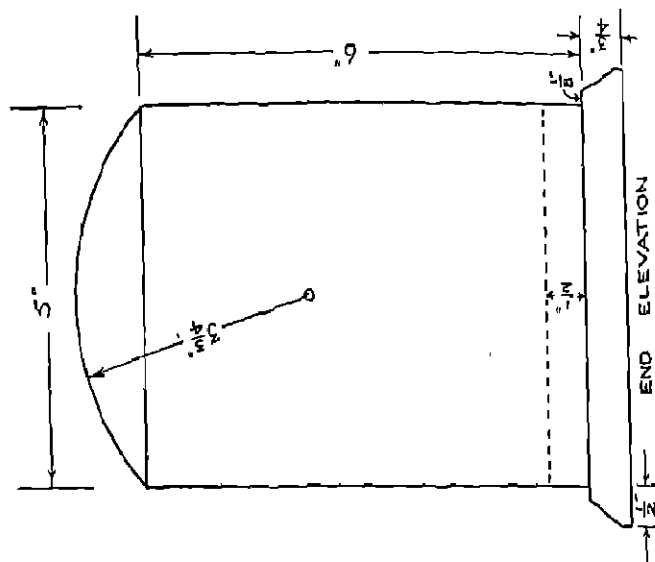
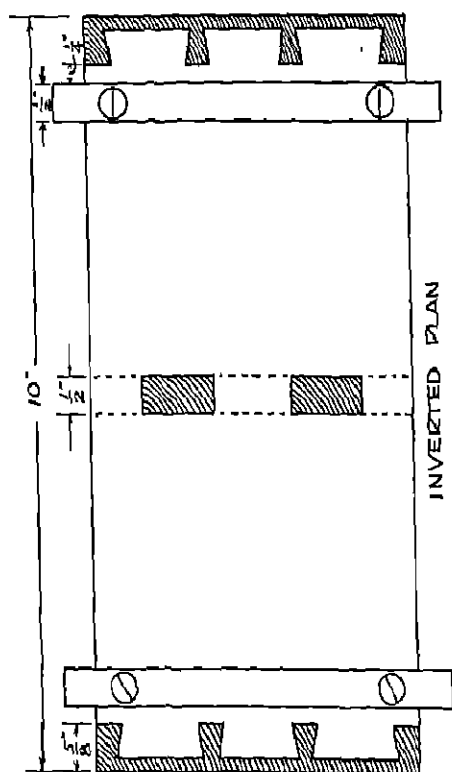
"A" AND "B" PLUS GROUPS

THE purpose of this concentrated section of the whole course is to instruct the children in the essentials of carcass construction, table construction, and the application of decorative processes to a finished construction before they go on to individual work.

The fundamentals of all constructional work are either the box form of the carcass, the leg and rail form of the table, or a combination of both; to which belong the various decorative aspects forming an actual part of the work, and not merely added to it as an afterthought.

Completion of this section also forms a final revision of methods taught already as separate exercises.

The work in this section is carried out in hardwood.

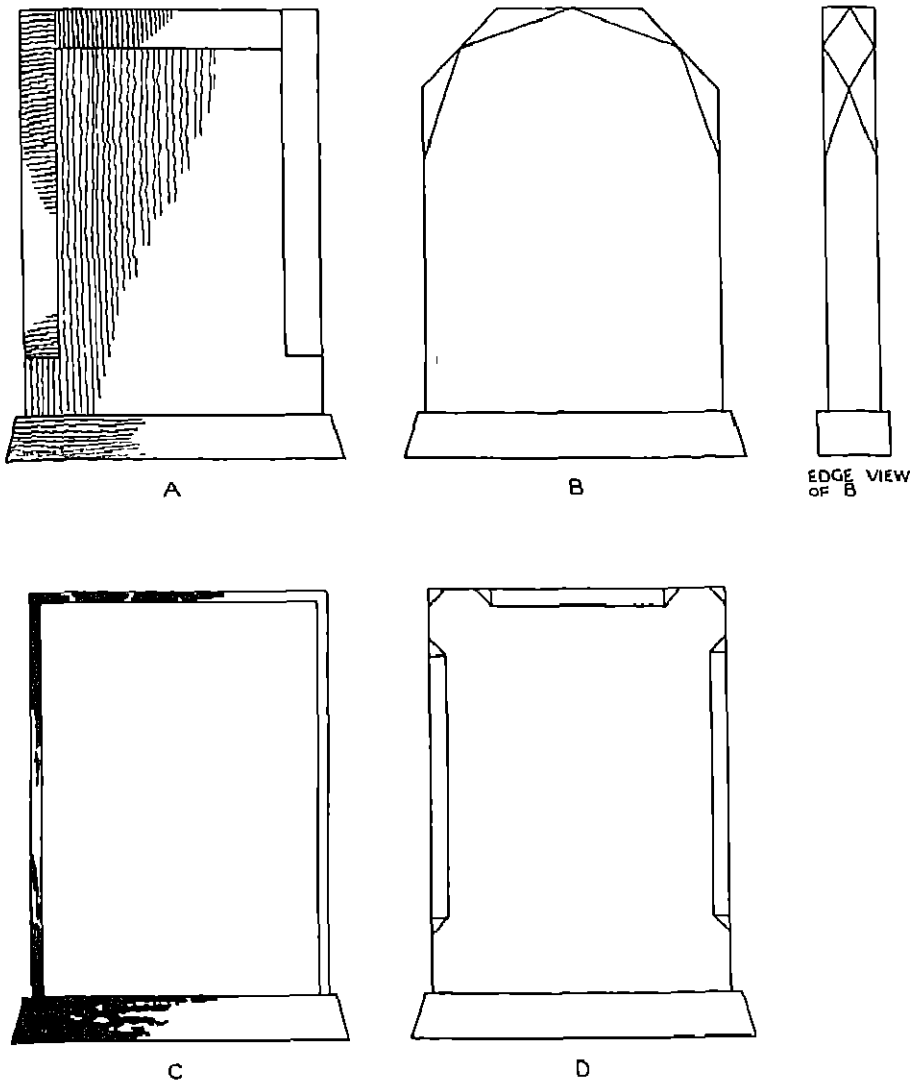


EXERCISE I. STATIONERY RACK

EXERCISE 1—STATIONERY RACK.—As the diagram shows, no entirely fresh processes are introduced in this job as regards the construction. The only new state is the use of the double tenon in the centre member. It is unnecessary, therefore, to detail the working procedure, and only the setting-out of the double tenon and method of cutting the mortises across the grain should need to be demonstrated to the class.

The ends of the example shown in the diagram are left plain and free from any suggestion of ornament. If made in light oak they may quite well be left as shown.

It is advantageous to have each boy in the group making the stand exactly to this construction, but with a different decorative finish. Thus, one third of the group make it in oak; one third in mahogany, and one third in walnut. In the oak group, one lad will shape the end; one will use chamfers, and another will try some decoration in low relief, the end



EXERCISE 1 (CONTINUED). METHODS OF DECORATING THE ENDS

being shaped to suit the style in each case. The mahogany jobs will be edged with black or white line, veneered, or shaped and/or chamfered only. The boys doing the walnut section will use veneer, line, shaping or chamfering to suit the wood.

In this way, on the completion of the job, the boys will have the opportunity of seeing the various timbers and decorative processes associated and used comparatively for a single construction. Notes should be taken of the various stages and methods as the work is proceeding. This system will give the class a grounding that could not be taught in a more convincing or concise manner in the principles of design and good taste in decoration.

Different finishes should be used for the individual jobs. The oak may be oiled or waxed; the mahogany French-polished or waxed; the walnut oiled, French-polished or waxed. Brass screws should be used throughout.

If objection is felt to the plain screwing on of the small footings—although it is a perfectly legitimate construction—they may be secret slot-screwed instead. On such a small job, however, this is not an easy method for boys who are comparative beginners, and it is not recommended. Providing that the screws are properly countersunk, and turned in neatly, there is nothing to be ashamed of in their presence.

The diagram shows four typical methods of including a decorative process in the construction:

(A) A plain veneered end with crossbanding. The latter is not mitred at the top corners, but the upright banding is carried right through. This gives a stronger corner, and is more in keeping with the constructional lines.

(B) A shaped end to which is added a decorative chamfering. The latter does not conflict with the shape of the end, but merely enhances it. (A bad example would be this shaped end with a parti-coloured diamond inlaid in the centre. The diamond would be entirely out of keeping with the shape of the end, and would have nothing in common with the rest of the job.)

(C) A plain end, unveneered, and finished with a $\frac{1}{8}$ in. square section line of contrasting colour.

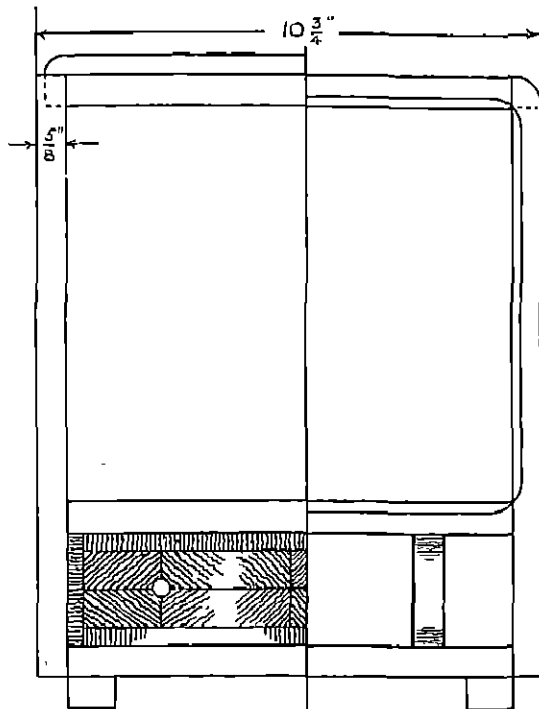
(D) The same end treated with stopped chamfers—again emphasising the rectangular form.

EXERCISE 2—SMALL CABINET FOR CARCASE CONSTRUCTION.—The diagram shows alternative construction and treatment for the same article. The left-hand half of the front view gives a suggestion for a mahogany job; the right-hand half for an oak one. Either treatment is applicable to walnut.

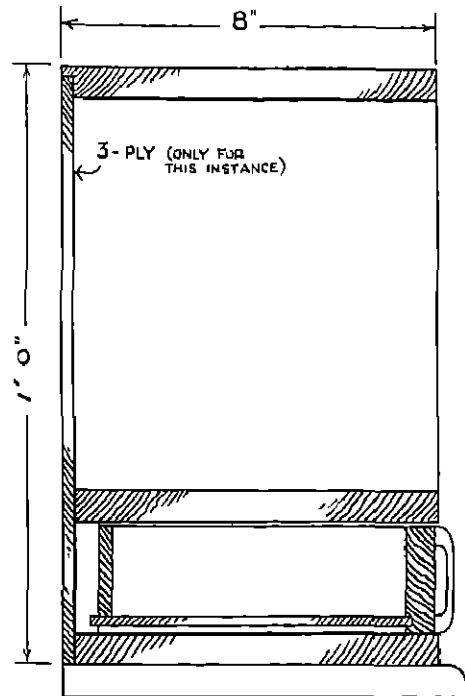
The mahogany design has two top carcase rails, about $2\frac{1}{4}$ in. wide, lap-dovetailed in at front and back. The actual top is of $\frac{3}{4}$ in. stuff, "planted" on the $\frac{1}{2}$ in. rails and just covering the joints at the ends. It is screwed on upwards through the front and back rails, the screws being well countersunk from inside.

The drawer construction is the same in each case and as shown in the diagram. It is not strictly correct to use a three-ply bottom grooved directly into the sides as shown, but this method will save time. If time is of no object, the correct method should be adopted of making a slip as shown in the diagrams, and of using a solid $\frac{3}{4}$ in. panel bevelled on the under side to fit the groove in the slip. It is customary in this case to cut a clearance way for the supporting screw in case shrinkage should take place in the bottom, as shown, but this method is seldom used nowadays following upon the introduction of plywood. It is a traditional method, giving a superior finish to the job.

For the same reason—saving time—the back is a single sheet of faced plywood. The correct method of framing and panelling the back is indicated in the diagrams showing units of

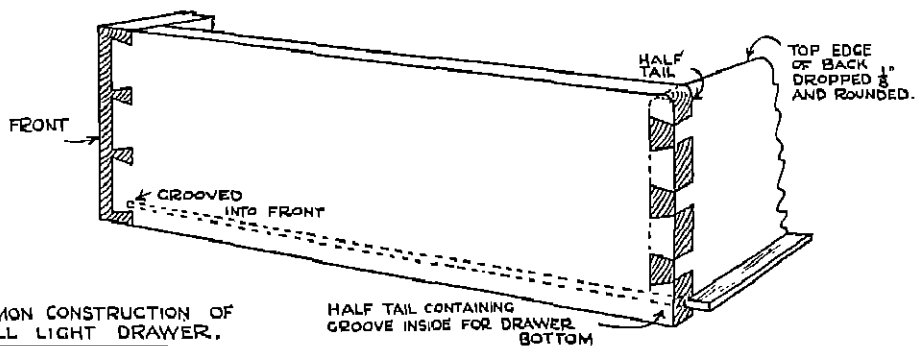


FRONT VIEW



SECTIONAL SIDE ELEVATION

VENEERED DRAWER FRONT ROUND KNOB TOP "PLANTED" AND SCREWED	PLAIN FRONT INNER CARCASE EDGES CHAMFERED WOOD DRAWER- PULL
ALTERNATIVE TOP RAILS LAP-DOVETAILED	TREATMENTS SOLID TOP THROUGH DOVETAILED



COMMON CONSTRUCTION OF
SMALL LIGHT DRAWER.

EXERCISE 2. SMALL CABINET

construction for a box carcass. It should be noticed that for this latter method the rebate cut along the back edges of the carcass sides, to receive the thickness of the back, is of a different section, being splayed and not cut in square as for plywood.

Another advantage of a frame-up and panelled back for a large job is the rigid support that it gives to a carcass, preventing any diagonal springing of the carcass or loosening of the joints under strain, a thing which often happens when large and heavy carcasses are lifted about or stood on uneven flooring causing doors and drawers to stick, or refuse to shut easily. The framed back, being firmly screwed home in the rebate, holds the carcass square. For a small job of the nature shown, however, a framed back is really unnecessary.

Again, the shelf is plain stop-housed into the carcass sides (see unit diagrams), whereas in a larger job it should be dovetail-housed for the first few inches to pull and hold up the front shoulders, or dovetail-housed right across where the sides are likely to bulge for any reason.

The carcass bottom is plain lap-dovetailed up into the carcass sides, the footings being screwed up into it from underneath. These, should the job be intended for use on a polished table top, can be finished underneath with a strip of baize glued to the footing.

In the oak job, the carcass top is also the actual top and is frankly through-dovetailed to the carcass sides. The harshness of the top edges may be relieved in this case by quarter-rounding them off, as shown, after the joint has been glued up and cleaned off. The remaining construction is the same.

The walnut cabinet may be finished in either of these ways, depending upon the style adopted; or, the more advanced method, shown at A in the diagram of the box unit, may be used. This gives a neat finish to the job, and avoids a clumsy appearance sometimes due to the use of a "planted" top, at the same time giving a more delicate outside view than is presented by the through dovetail.

Decoration.—The decoration incorporated with the construction depends entirely upon the style and timber used.

The veneered drawer front is best suited to the mahogany job. The method of carrying out this veneering is given in the section on Decorative Processes.

A plain drawer front with a wood pull and chamfered inner carcass edges, as shown, is best carried out in light oak. The chamfers should be cut before gluing up the carcass and after the joints have been assembled and tested dry in the cramps. The pull may be screwed on from inside the drawer front, the screw being set in about $\frac{1}{8}$ in. below the surface and the hole being neatly plugged with oak, walnut or ebony.

Either style of decoration may be adopted in walnut, but the styles should not be mixed. Many variations in the detail of veneering or chamfering are possible, and each job made by the group should be individual as regards the timber used and the decoration detail employed, as was the case with the stationery stands.

Units for a box carcass.—A key to these as one standard method of construction is included here as certain of them are applicable to this exercise, and others to later and more advanced work. The class should know of these at this stage in the course, the individual variations in the joints being dealt with as occasion for their use arises.

Thus, in simple constructions, the following are needed:

Carcass top (G).—Solid where no "planted" or over-top is to be used. It may be through-dovetailed, secret lap-dovetailed as shown, or secret mitre-dovetailed.

Carcass top rails (H).—The alternative to G when a "planted" or screwed on top is to be used. Plain lap-dovetailed. *Note:* When this method is adopted the back rail must be set in from the back edge of the side by the amount of the thickness of the back itself (see enlarged detail).

Shelf (J).—For a drawer or doors underneath or over. Housed plain, as shown, for a small job; dovetail-housed for a larger job. Back edge of shelf is set in flush with the inner edge of rebate taking back, which goes behind, and up to, the shelf.

Carcase bottom (K).—Solid if open to view, and lap-dovetailed to the carcase sides, as shown. Rails, as in the case of the top, may be used when a drawer is fitted at the bottom. The carcase back goes behind the bottom, solid or rail, and finishes flush with the under-side.

Carcase sides (M).—The same width as the solid top. The thickness of the back wider than the shelf, and the bottom, solid or rail.

Drawer rail (N).—To carry a drawer and show the full thickness of the stuff on the carcase front, flush with the other front edges. Double stub-tenoned into the carcase side.

Drawer runner (R).—Fitted in each side flush in thickness with the drawer rail. On small jobs with $\frac{5}{8}$ in. carcase sides may be screwed on to these, as shown. For larger work with heavy drawers, should be tongued at front end into drawer rail to prevent twisting.

Secret lap dovetail joint (A).—Useful for jointing a solid top to carcase sides where a step moulding line is wanted. It is the ordinary lap dovetail, but with the tails cut only to within about $\frac{1}{8}$ in. of the top surface. The whole thickness of the end is squared, so that when the joint is fitted, $\frac{1}{8}$ in. is left standing above and set back from the face of the side forming a small rebate—into which a square string or line may be fitted if desired. It gives a neat finish to the corner without the necessity of using the secret mitre dovetail.

Plain lap dovetail (B).—Used for rails where the joint will be covered by the planted top.

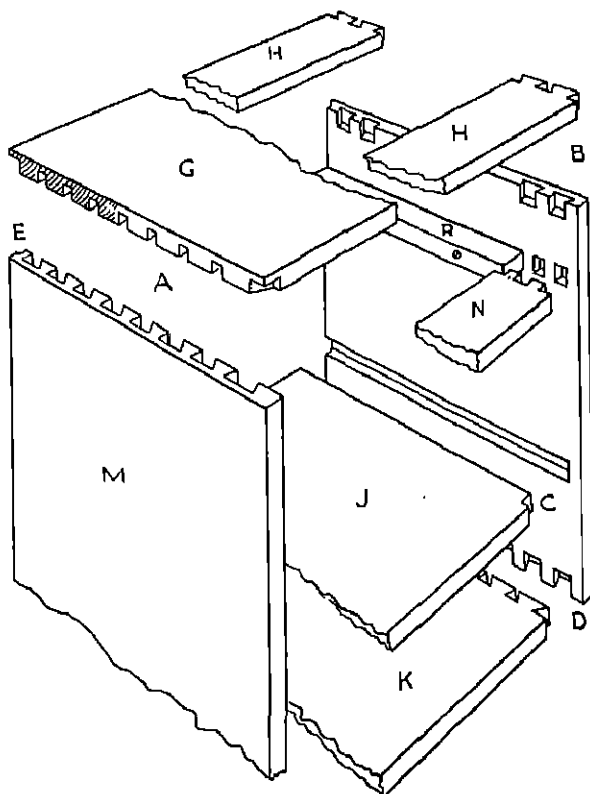
Plain stop housing joint (C).—For small shelves.

Plain lap dovetail (D).—For carcase bottom.

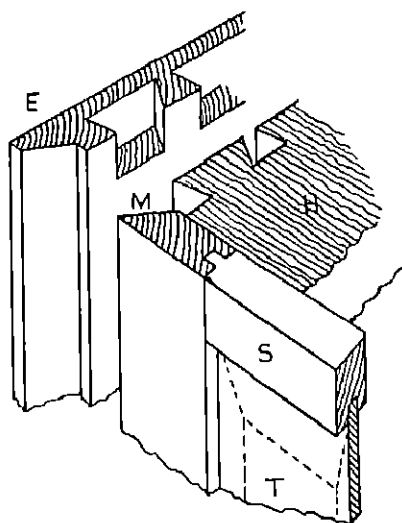
Enlarged diagram of details for box carcase.

(H) Solid or rail top already referred to above.

(M) Carcase sides referred to above.



EXERCISE 2 (CONTINUED). DETAILS OF CARCASE



EXERCISE 2 (CONTINUED). ENLARGED DIAGRAM OF DETAILS FOR BOX CARCASE UNITS FOR LATER AND MORE ADVANCED WORK

(S) Top rail of back framing, where three-ply is not to be used but a rigid back is needed as for larger work.

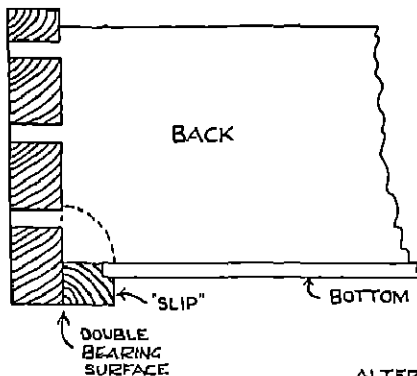
(T) Solid $\frac{3}{8}$ in. panel for back, grooved into framing, and bevelled on the outside until it fits grooving without rattling. Three-ply wood may be used instead, and is desirable where large panels must be included when the framing cannot be sub-divided for any particular reason by other rails. A large solid panel will shrink away from the grooves and leave a gap showing, as panels should not be glued in if they are solid for they are likely to split down the length.

(E) The splayed rebate cut to take the thickness of the back framing, so that the back of the whole job will finish flush. The splay is included as it enables the back frame to be screwed home in the strongest way.

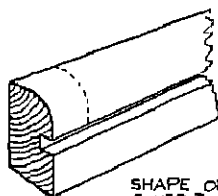
This rebate is always cut right along the length of the back edge of the carcass side. If the joint shown at (A) is to be used, a plain rebate of the same depth is cut along the under side of the top, the latter being advanced sufficiently to cover the opening in the side made by the end of the rebate.

The rebate in the side is cut in the ordinary way but, being splayed, the line on the edge of the side thickness is a pencil line and not a gauge line. A gauge line is used on the inside face of the side. The back framing is then made square edged (so that it may be cramped up for gluing) to the full over-all width of the carcass (previously glued up), and is then planed off at the edges on each side until it fits snugly into the carcass and up to the top, shelf and bottom back edges.

When three-ply wood is used instead of a framed back, the small rebate for this is cut in the usual way and there is no need for it to be splayed off. In either case where oak is used the screws should be brass.



ALTERNATIVE METHOD
OF CARRYING BOTTOM—
ADVISABLE IN LARGER
DRAWER.
AND FOR MORE ADVANCED JOBS



SHAPE OF SLIP,
GLUED TO DRAWER-SIDE —
DOTTED PORTION CUT AWAY
ROUND DRAWER BACK.

EXERCISE 2 (CONTINUED). DRAWER DETAILS

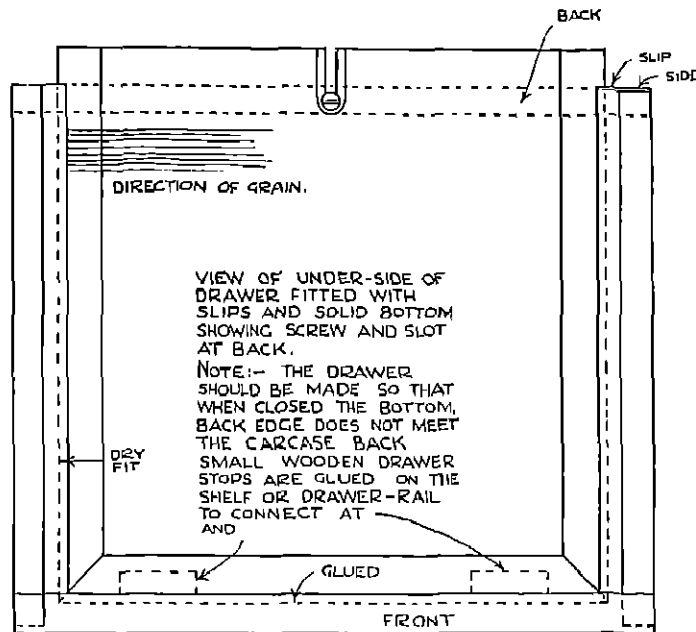
The making and fitting of drawers.—This branch of the work is rightly regarded as a test of the capabilities of the worker. It is no easy matter to make a drawer that will slide home easily in a light cabinet or table without sticking, or jamming, or rattling.

Whilst craftsmanship is the first essential to this end, there are several aids permitted in addition. The job should be done as follows:

1. Make carcass $\frac{1}{16}$ in. over-all wider at the back than at the front, no more and no less. This allows the fitted drawer to slide easily without rattling.

2. Cut, dress and fit the drawer front $\frac{1}{16}$ in. over-all too large to fit the carcass opening.

3. Cut, dress and fit the sides in the carcass so that they just slide in to half-way and no farther, and do not have any vertical play.
4. Dress the back to thickness and face edge, leaving some waste on the bottom edge.
5. Square ends to length on the sides and back.
6. Set out shoulder lines and all dovetails. Gauge the groove on the drawer front (and sides if a slip is not to be fitted), taking care that the groove is contained inside the bottom lap dovetail—otherwise a hole will be left in the end grain of the pins.
7. Cut and fit all joints. Plough the grooves. Round the top edge of the back.
8. Glue up drawer, testing carefully for squareness. It is not necessary to cramp up small drawers; it may be a cause of pulling them out of square to do so, especially if too great a pressure is applied.
9. If slips are to be used, the plough grooves in the sides will have been omitted, one



EXERCISE 2 (CONTINUED). DRAWER DETAILS

being run along the inside front only. These slips should be made now and glued and fitted as soon as the drawer is dry set.

10. The bottom is cut and fitted next, so that it does not rattle when tapped but is just a hand-tight push fit. The back is left projecting about $\frac{1}{2}$ in. if solid, but may be cleaned off flush if plywood. In either case, when the drawer is shut to the drawer stops, there should be a clearance between the bottom, or back, and the carcass back. The bottom is then glued in, front edge only.

11. The bottom helping to keep the drawer joints from being sprung, the joints are cleaned off with the iron smoother, the job being held firmly in the vice. This is important, as boys tend to let the plane jump on the end grain of the lap dovetails, causing a rounding-off at the edge and a bad fit when the drawer is shut. The drawer should not push in for about one third of its depth.

Working from this point, taking one shaving at a time in the direction from front to back, and from each side alternately, work to the front edge, gradually fitting the drawer home, and testing all the time for side play (causing it to jam) and vertical rattle. When the drawer is correctly fitted it should be possible to push it home by pressure of the fingers on one end only of the front.

The bottom edges, including those of the slips, should have been cleaned off flush before-hand and tested for straightness.

The top edges, then, should not need more than a shaving or so in cleaning off to fit.

12. Having fitted the drawer, mark the front rail of table or carcass for the glue blocks acting as drawer stops. Cut and glue into place.

Where handles or wood pulls need to be screwed on from inside, the clearance holes should be bored before the drawer is glued up. As there are several ways of attaching these, they are omitted from the above procedure. Sometimes they are dowelled on to the front, and sometimes mortised through it, so that the type of pull used and the method adopted should be borne in mind whilst making the drawer.

Where two or more drawers are needed, they should all be made at once, each stage in procedure being carried out throughout all corresponding members. Each single member should be clearly lettered at each end with the particular letter used for each joint, otherwise it is easy for confusion to occur when gluing up.

In a drawer, all face sides should be inside, and all face edges to the bottom (for gauging the grooves).

EXERCISE 3—TABLE IN OAK OR WALNUT.—The example suggested in the diagram is a straightforward construction suitable for various types of light occasional table, and, with slight modifications, stands for other articles such as wireless cabinets. The inclusion of a drawer is not essential, as drawer construction has been taken in the previous exercise.

The purpose of the particular example is to give instruction in the fundamentals of the construction of stools and tables, on which all subsequent work of this nature will be based including the framing-up of larger work such as a sideboard, a job suitable for evening school work.

In the diagrams showing units of table construction, one front corner is shown, and one back corner without the detail included in the front view. Where no drawer is fitted, the back construction is followed right round the table, but in the example shown, the following points should receive careful attention:

Top front rail (A).—This is made wide enough to allow of dovetailing as shown into both the leg end and the side rail, giving great strength and rigidity to the corner.

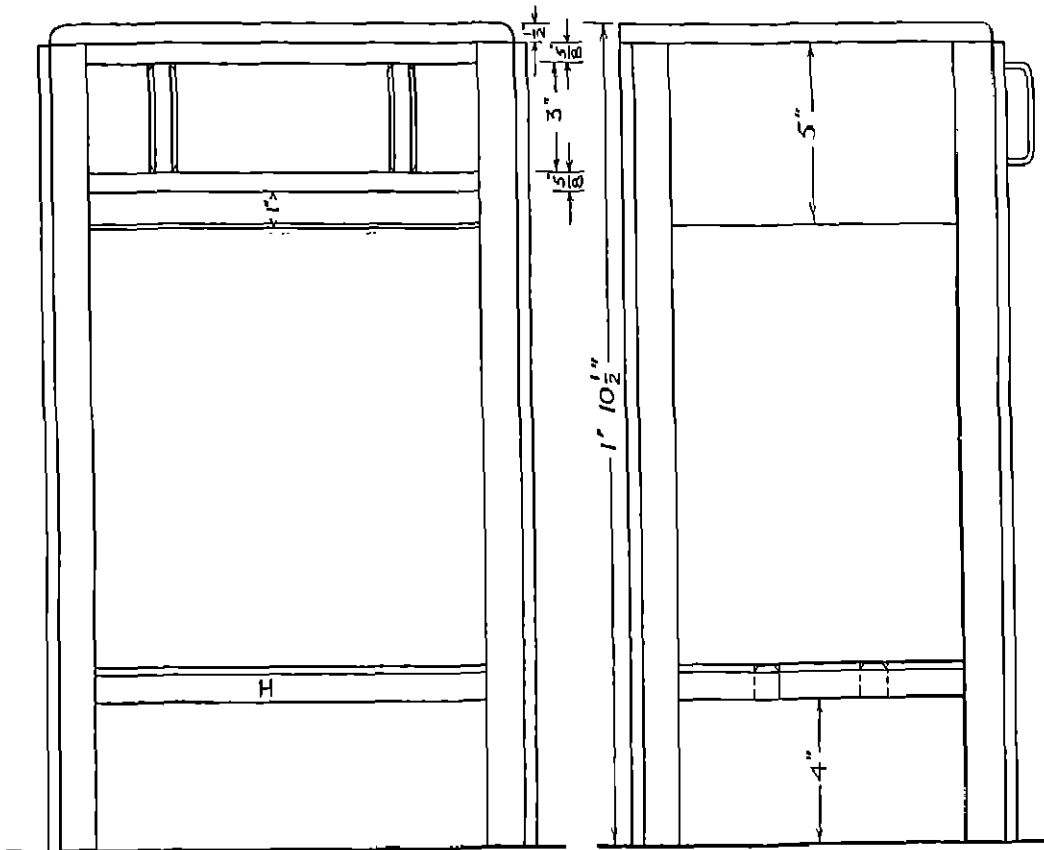
In large and heavier framings a back rail of a similar type should be fitted, with "wings" rub-jointed on to give a wider joint area. This precaution is also necessary for large carcasses where rails are put in.

Buttons (B).—When a set-back top is used, as shown, it is not possible to screw it on in the normal way; buttons have to be substituted instead. Care should then be taken to see that the grooves for these are cut before the table is glued up, and that they are not made of thicker stuff than the front top rail, otherwise they will foul the top edges of the drawer sides.

When an overhanging top is put on, the buttons may be omitted and it may be screwed on from inside, as shown. The clearance holes in that case are bored from a pencil line run about two thirds the thickness along the top edge of the rails, and not from inside. These holes are then countersunk from inside with gouges. While a top is being screwed on in this way it should be held up tightly to the rails with hand screws, otherwise it is very difficult to pull up the joint properly and to get the top to "sit down" on the framing.

Tie rail and side rails (C).—The tie rail should always be set back from the face of the drawer rail about $\frac{1}{8}$ in. If left flush, it appears as though one piece of wood only had been used, which had split down near the centre, as no shadow line is there. This member, besides assisting the joint strength, breaks the flatness of the front view and provides extra depth on the side rails for attaching the drawer runners. At the same time it is necessary to see that the side rails finish on a level with the bottom edge of the tie rail. The sectional diagram shows the need for this, and also the inclusion of glue blocks under the drawer runners to give extra support.

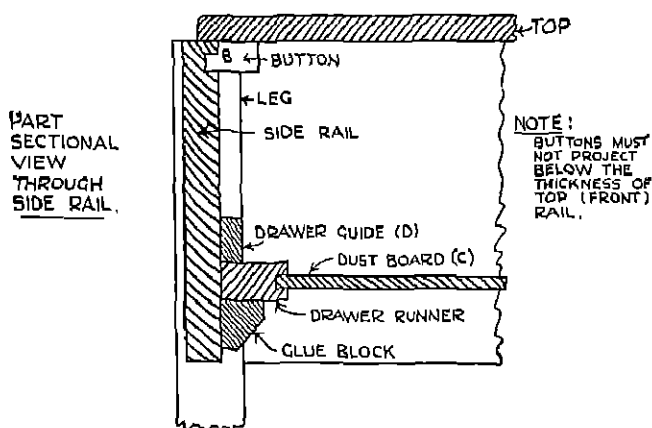
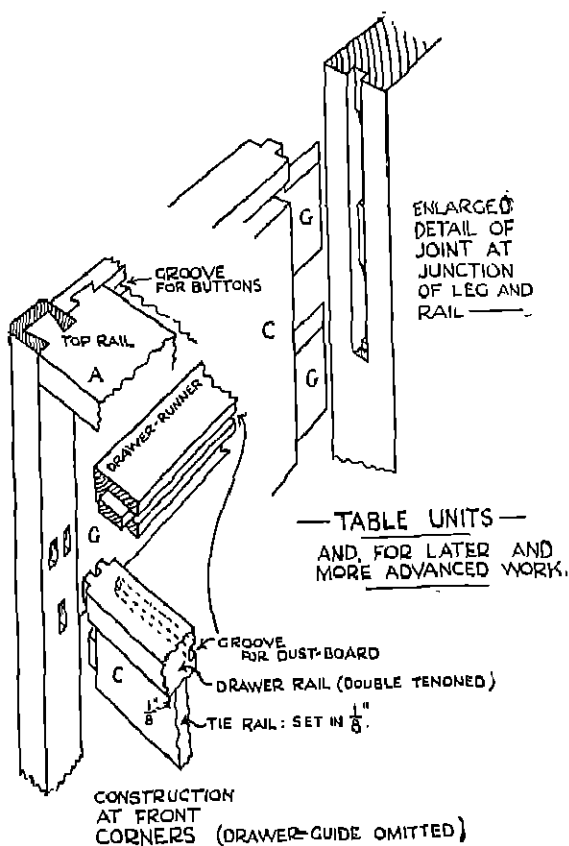
Drawer guide (D).—The difference in thickness between the leg and side rail gives rise to the need for some form of packing to enable the drawer to be fitted between the legs



FOR GENERAL
LIGHT TABLE
CONSTRUCTION

(DRAWER OMITTED
EXCEPT FOR A + GROUP)

EXERCISE 3. TABLE



EXERCISE 3 (CONTINUED). TABLE—DETAILS OF
CONSTRUCTION

and steadied to the back. This takes the form shown; a piece of stuff glued to the sides and thickened to come exactly flush with the inner leg faces. It need not be of the full depth of the drawer sides.

Dust board (E).—This is not essential to the construction, but is normally included to give a better finish to the job besides performing its obvious function.

Drawer stops (F).—These are not shown in the diagrams but they are glued to the upper surface of the drawer rail to engage with the back, bottom edge of the drawer front at the moment when it is correctly shut, to prevent it from banging up against the table back.

Double tenons (G).—On a narrow side or back rail these are not necessary, but on a wide rail of normal width where a drawer is covered it is advisable to use this method as a stronger joint is obtained. A stopped groove should be cut *after* the mortises are cleared to take the haunches.

Stretchers (H).—These rails are mortised and tenoned in, and are chamfered before being glued up. Care should be taken to allow for the extra length between shoulders on the two centre stretchers, occasioned by the different thicknesses of leg and rail. Leg chamfers are planed before gluing up. The wood pulls are shaped, screwed on, and the holes plugged from inside, the holes being bored and countersunk before the drawer is glued.

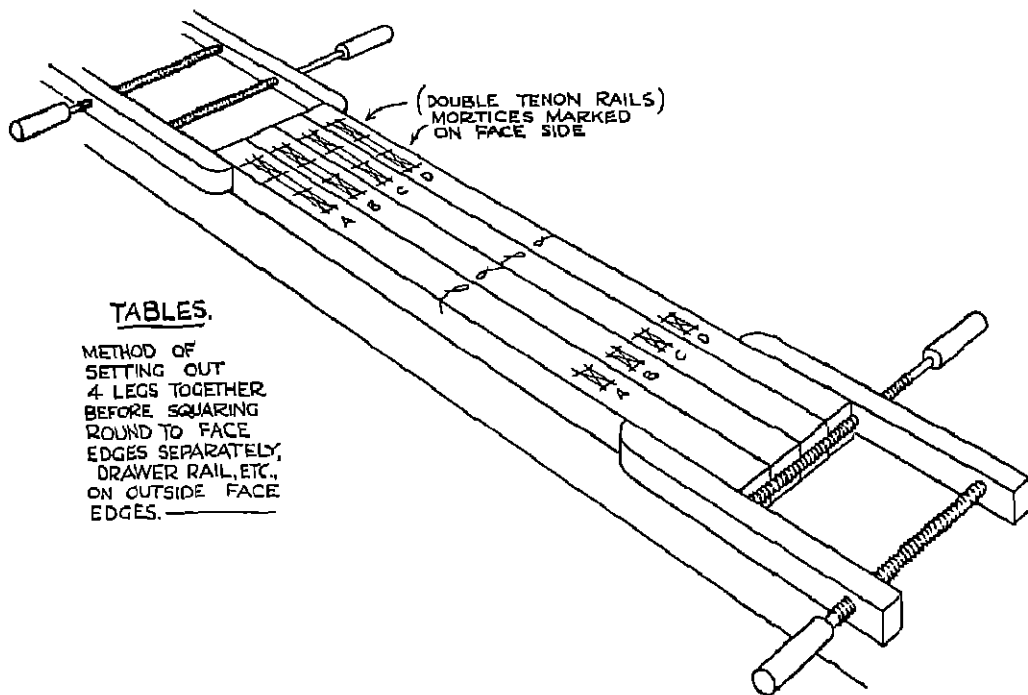
The four legs are squared-up and cramped together for the marking out of length and position of the mortises, etc. The two sides of the table are made first, and fitted dry in the cramps, including the stretchers,

Then front rails, back rails and stretchers are jointed and fitted dry. When correct and checked for everything (such as button grooves or chamfers) that has to be done first, the ends are glued up and left in the cramps to set. Meanwhile the drawer stuff can be cut out and dressed up.

The cramps removed, the remaining members are glued up and the whole table left square in the cramps, providing that the drawer runners have been fitted, etc.

Provision should have been made, as in carcase work, for the easy fitting of the drawer by making the back rails $\frac{1}{16}$ in. longer than the front ones. This means only $\frac{1}{32}$ in. each side out of square when glued up, but it is better to do this than to attempt to taper the drawer guides.

Making and fitting of the drawer proceeds as for the previous exercise.



EXERCISE 3 (CONTINUED). TABLES—METHOD OF SETTING-OUT FOUR LEGS TOGETHER

Although the main sizes may be retained, each individual table made by one of the groups concerned should have slight modifications of detail in design. On the oak jobs the pulls may be varied and placed differently; the chamfering may be changed; an overhung top may be fitted; and so on.

The walnut tables may be even more varied. One will be a replica of the oak design; another may have a veneered drawer front with a contrasting line run round the edges of the top; yet another may have both drawer front and top veneered, the latter for instance being quartered in figured French walnut. If owing to pressure of time or the lack of ability of any members of the group it is desired to simplify the design, it would be best to omit the drawer altogether, but the value of the training it gives and the general usefulness of a drawer make it advantageous to retain it as an essential part of the design.

This concludes the fixed, training portion of the course. From this point onwards the work will be either individual or carried out as group projects.

The detailed descriptions of constructional methods and processes will not be repeated again, but will occur only incidentally as occasion arises for the introduction of fresh procedure.

As all groups will participate in both "indoor" and "general" woodwork from now on, the examples dealt with will not be allotted to any special groups. This would have to be done on the spot to suit the individual case. Again, the writer desires to stress the fact that the remaining examples shown or quoted in the photographs, diagrams and text do not constitute a fully comprehensive course. They merely indicate the ground to be covered, and are intended to serve as starting points for individual elaboration.

DECORATIVE PROCESSES

THE value of any decorative process in woodwork exists only in so far as the result, when it is applied to any particular job, enriches that job and adds to its usefulness, appearance and value by emphasising its main characteristics, style and proportions. Decoration should never detract from these constructional factors, confuse their effectiveness, or be added merely as an afterthought.

Ornament may be said not to be non-existent without a background—a seemingly obvious statement which is frequently not recognised. It is no unusual thing to see a piece of carved work carried out and completed on a wooden panel, before any real thought is given to the article of which it is to form a part. Something has to be made to "show it off,"—generally with unfortunate results. In such a case the ornament has been regarded as being of primary importance. Undoubtedly it is possible to build a suitable job about a carved, inlaid or veneered panel, but it is seldom possible to do so without possessing a fairly wide knowledge of the values and principles of design, or without the finished piece being entirely out of keeping with its surroundings when placed in a normally furnished room. It is, in short, putting the cart before the horse and is the wrong end from which to start.

Beginning a design.—Assuming that any particular piece of furniture or general decorative woodwork is required, the first things to decide are: (1) Where it is to go; what it has to harmonise with, if it is to form part of a suite already there; and for the same reason what timber is to be used. (2) The size, which depends upon the purpose for which the article is to be used, and upon the factors of (1).

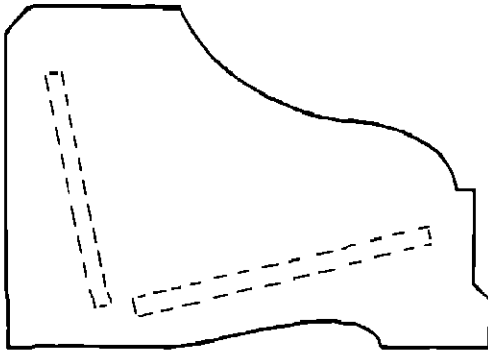
Once the rough idea has been formed, the style to be adopted is of great importance. The job may be in oak; it may be finished in natural or "light" colour, medium or "dark," and the style will vary accordingly. It will differ also, normally, from that chosen if the work is to be made in walnut, or in mahogany.

The main proportions being decided, then—in order to conform to the purely utilitarian necessities—the style of decoration may be considered. The piece may be perfectly plain; it may have a plain surface with shaped edges and chamfers (as in church work); it may be plain panelled with carved or tool-decorated framing; it may be plain framed with carved panelling; or it may be partly or wholly veneered. It may be finished in natural colour; stained and polished; or painted and enamelled.

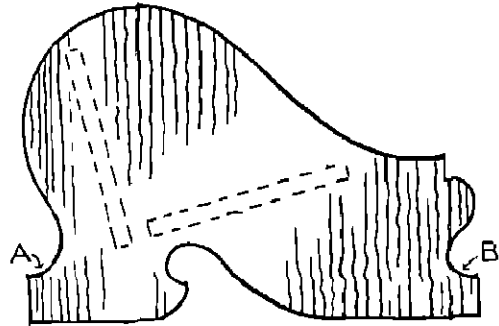
The style will be decided usually by the scheme into which the piece is to fit. But, once

the particular style is chosen, it should be adhered to rigidly, as a mixing of styles is never satisfactory and may be ruinous in the final effect.

Faults due to mixed styles.—Veneering and carving should never be associated in the one job. The disappointing results of this practice may be seen in popular furniture shops which exhibit, for instance, sideboards of pleasant design and proportion, veneered nearly all over and fitted with "turnip" or other fancy feet and carved (machine cut) "planted" mouldings, strips, and similar ornamentation. Wardrobes in particular suffer from the maker's inability to leave the finished job alone, and they have all kinds of weird shapes

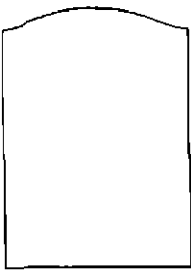


Good

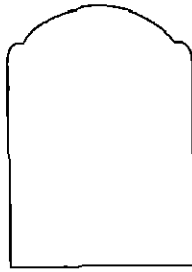


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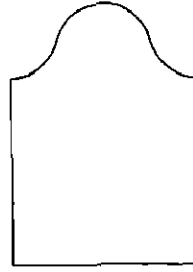
COMPARISONS IN DECORATION—1. BOOK RACKS AND TROUGHS



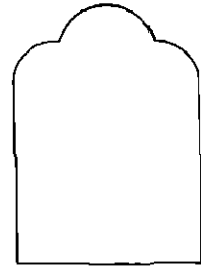
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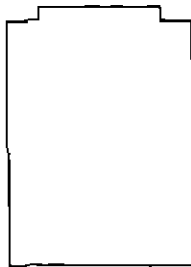
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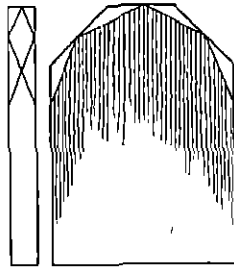
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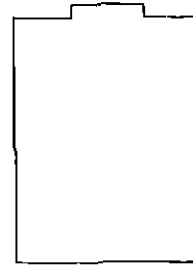
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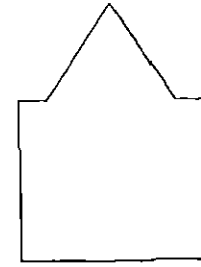
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D



C

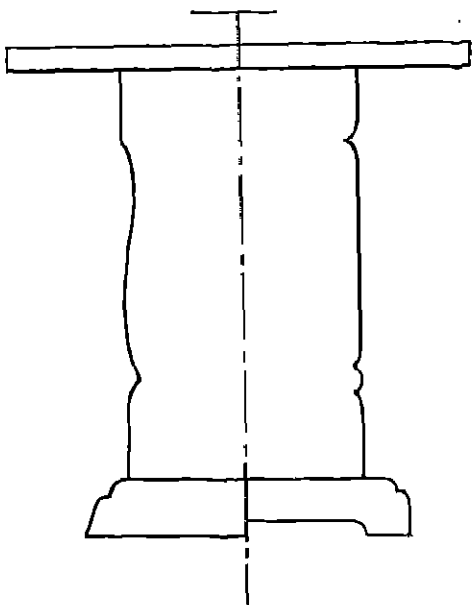


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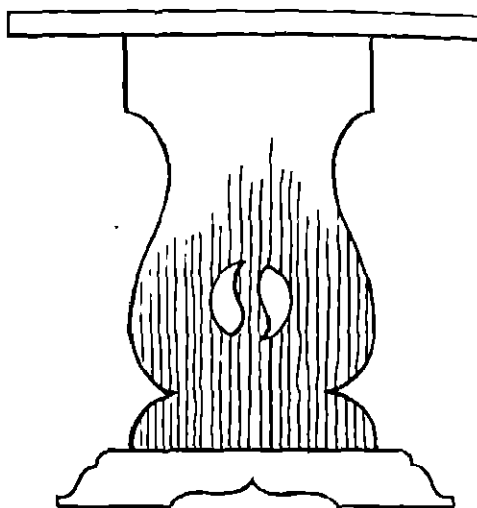
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COMPARISONS IN DECORATION—2. BOOK ENDS

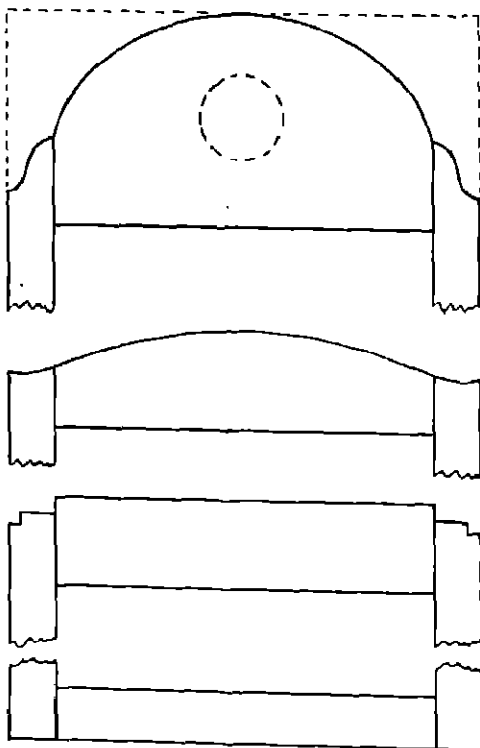


GOOD

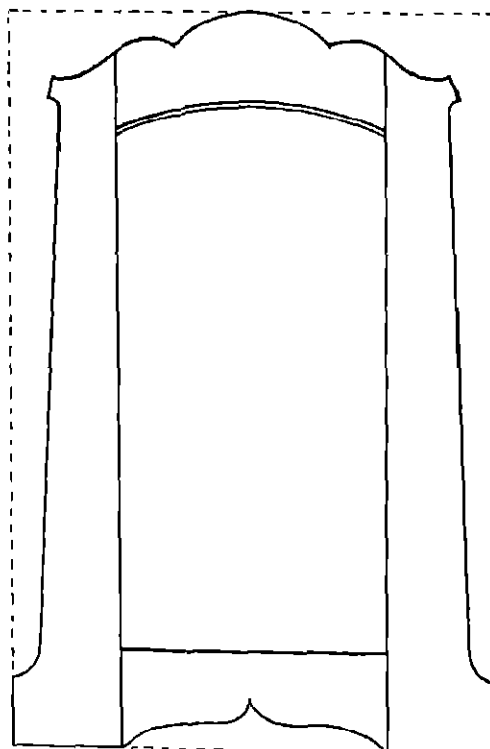


BAD

COMPARISONS IN DECORATION—3. SMALL TABLES



GOOD

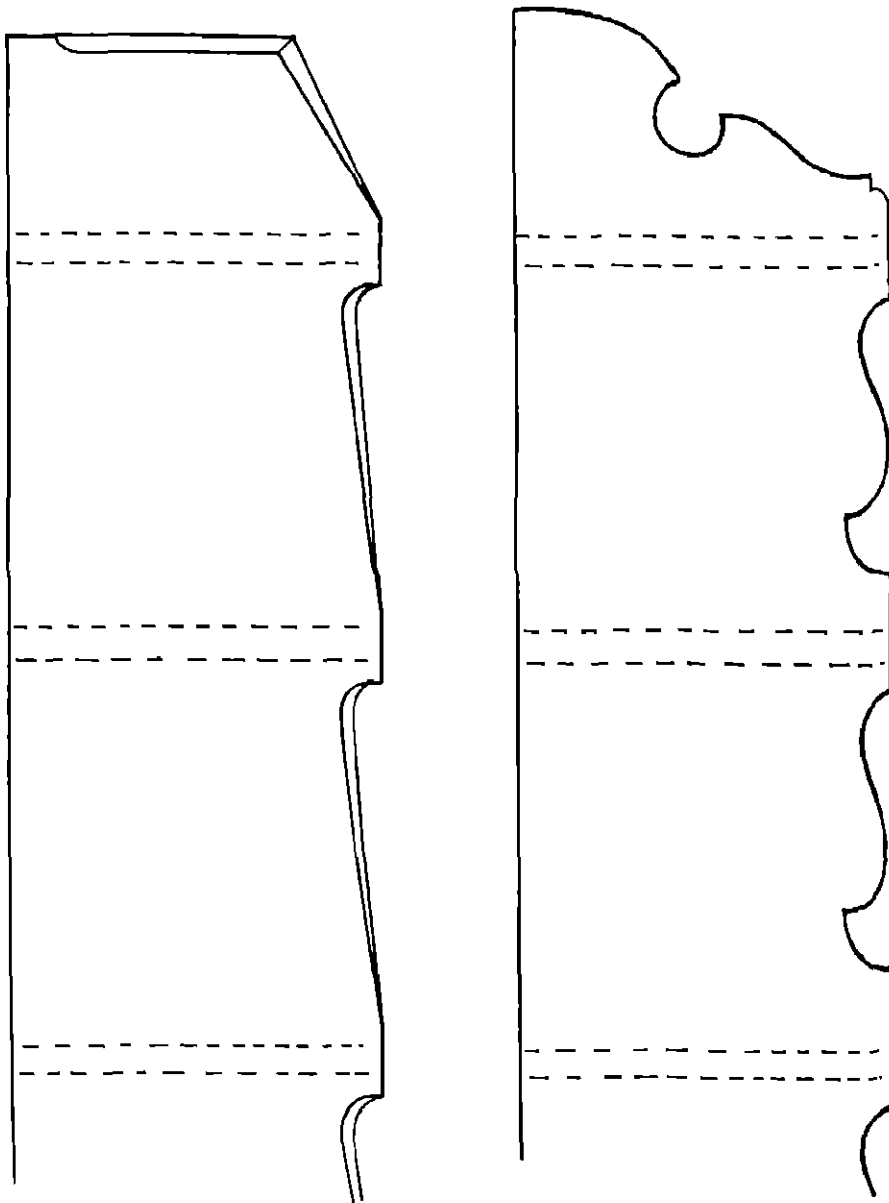


BAD

COMPARISONS IN DECORATION—4. FRAMES

planted on the cornices, carcase edges and doors, whereas their main proportions and surface decoration may be quite satisfactory.

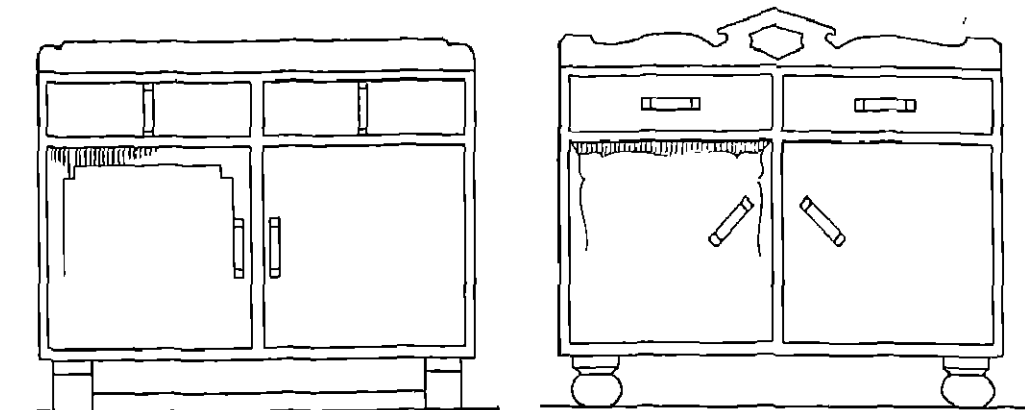
Such over-ornamentation merely adds to the cost, serves no useful purpose, and detracts from the value of the piece. Expostulation will bring the reply that "the public likes it." This finally clinches the argument in favour of attempting to teach the principles of good construction and design of furniture in senior schools, for they



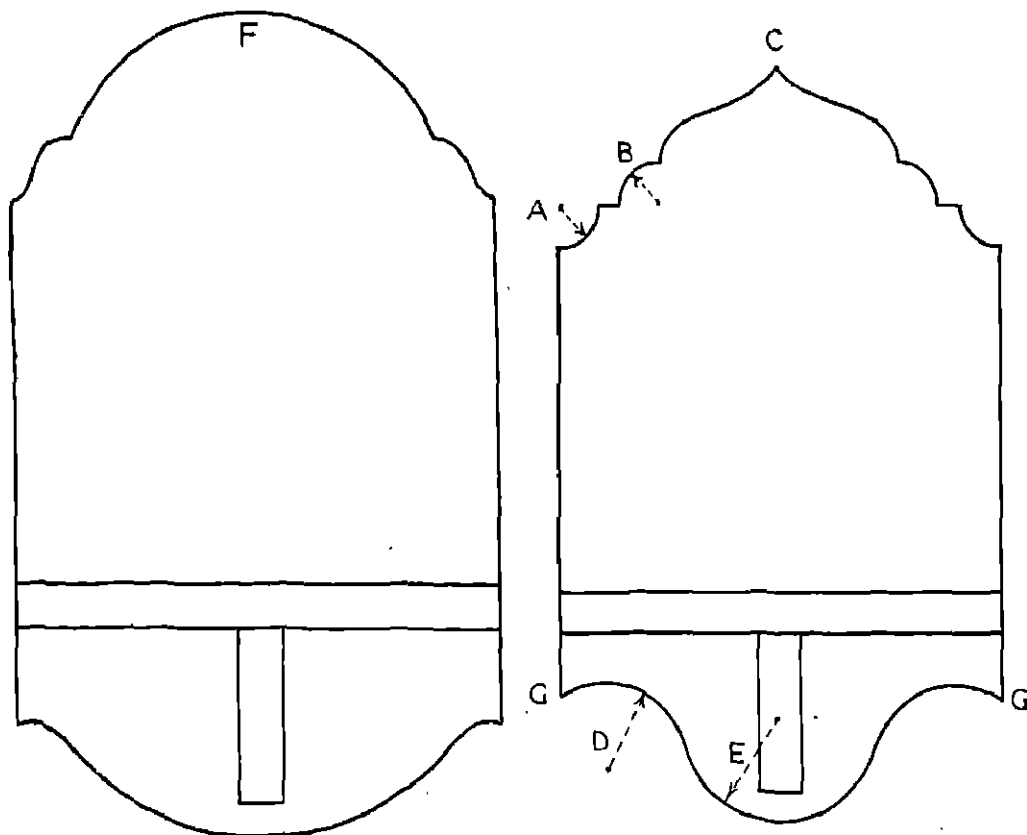
GOOD

BAD

COMPARISONS IN DECORATION—5. BOOKSHELVES



GOOD BAD
COMPARISONS IN DECORATION—6. SIDEBARDS AND CABINETS



GOOD BAD

COMPARISONS IN DECORATION—7. BRACKETS

will provide the public of ten years hence. What the public demands, the manufacturer is careful to supply.

As may be clearly demonstrated by the changes of recent years—largely due, it may be, to the film “set” noticed on the screen, and which is often of a high standard of beauty and good taste—changes from the heavy and ornate mahogany styles of the last century to the so-called modern exaggerations in glass, tubular steel and veneers, have been made in response to a demand. Expense had originally a great deal to do with the change, in addition to the general adoption of a more compact style of house, in particular, the semi-villa type in contrast to the large Victorian terrace house. Furniture needed to be smaller and cheaper to suit the changed conditions of life and the smaller rooms now in vogue.

Avoidance of extremes.—The pendulum has returned recently from the extreme limit of its swing, and it is now no uncommon thing to see suites of furniture, at reasonable prices, which avoid the exaggerations of style and which embody in themselves many pleasing features such as plainness of line, reasonable solidity, and restraint in added decoration.

There is still, however, plenty of scope for improvement in design. It is, again, no uncommon thing to see displayed in a shop window a well-proportioned and pleasantly finished piece to which the manufacturer has been unable to resist adding an ugly bronzed or chromium-plated atrocity masquerading as a handle or pull, but which actually serves no such purpose. It is placed there merely for ornament. Wardrobes, to quote them as an instance once more, provide a happy hunting ground for this form of misapplied decoration, but it is also common among the many types of door and drawer pulls, so often seen to be entirely out of keeping with the rest of the design and with the timber used.

The use of carving in the school.—Carving is a fine craft with a magnificent tradition, and the writer does not intend that any derogatory criticism of it, as a craft, should be inferred from these pages. It is the difficulty of its correct application to constructional work that causes its partial omission from this scheme, in addition to the fact that it needs to be expertly done to be of much value in a senior school course. In the time at the disposal of the handicraft teacher it is well-nigh impossible for a pupil to reach any high standard of workmanship along with the necessities of the constructional side, hence it is suggested that work in high relief is best left alone altogether. On the other hand, carving is touched upon frequently in the form of work in low relief, which is eminently suitable for a school course.

This latter method of decoration is sufficiently advanced and difficult for a lad of eleven years plus, and will provide adequate scope for designs carried out in the first stages in the art room. Along with edge-shaping, chamfering and veneering, a decorative range that covers all the needs of the course is possible. Other processes such as gesso work, inlaying and marquetry, or intarsia, may be used in individual cases, but they do not form a part of the basic ornament adopted for the general purposes of the school course.

Edge-shaping.—This form of decoration is most useful for the outlines of jobs in fairly thin stuff. The edges of mirror frames, bookracks, stands and shelves, bed frames (head and foot), and guard rails of desks and tables are suitable objects.

Method of working.—

1. Set out the shaping with cut lines on the face side of the job, using the marking knife and the steel points of bow compasses.
2. Set out corresponding lines on reverse side.
3. Cut close to lines in waste wood with the bow saw, from face side, to cut away waste. Saw into the corners.

4. Finish square-edged to cut lines with spokeshaves, flat and round, scribing gouges, and paring chisels as convenient.

5. Test edges with try-square from face side.

6. Glasspaper carefully with fine No. 0 wrapped round a flat-faced tool. Filing of edges is deprecated, as it is most difficult for lads to get and keep a square edge with this tool, whilst it tends to tear the edges of the wood. Clean-cut faces and sharp, clean edges are essential to good work, and the practice obtained in getting them makes this a valuable part of the course.

Note.—Edge-shaping should not be confused with piercing or fret ornament. On no account should curved pieces be cut out from an otherwise plain member for the sake of "doing something to break it up." It is a practice that weakens the member considerably; does not add to the value of its appearance; often prevents good polishing; collects dust and dirt. In any case, it is a method foreign to wood construction and more suited to certain kinds of decorative metalwork—where it may be a perfectly legitimate procedure.

Chamfering.—This traditional form of ornamentation may be used to great effect on otherwise plain work. It softens and enriches otherwise harsh lines and has utility value in removing sharp edges from much handled parts of a job. It is seen commonly on church work, and in one of its most attractive forms as the wagon chamfer on hay wagons, milk floats, etc. These larger forms are cut with a knife, or with a particular type of spokeshave.

Method of working.—The width of the chamfer on the flat face should be set off along the edges concerned and on the adjacent faces with a pencil line. Gauge lines should not be used as the chamfer will be too wide by the time that such lines are eliminated. The pencil line may be run along with the finger only, but a boy will find it easier to use a thumb gauge cut from a small piece of wood and shaped like a table button with a notch in the end to steady the pencil point.

If the chamfer is stopped near the ends of the member, the shoulders at each end should be cut in first, care being taken not to go too deeply. Then, resting the left or guiding hand on the surface of the wood, the fingers firmly held round the chisel blade and the thumb extended along its edge towards the handle, both hands are moved steadily along the wood as an even shaving is taken off by the chisel.

When the chamfer is nearly to the pencil line, the hands are moved slightly for each cut so that the chisel edge is really rotating in a diagonal cutting movement across the chamfer. The blade of the chisel is held firmly flat on the chamfer face and thus the slightest inequalities of its surface can be removed until the chisel reaches the pencil line.

Unbroken chamfers running the full length of the stuff should be planed. In either case the direction of the cutting is with the grain.

Finally, the ends of the chamfer are cut in from the edge of the stuff to meet the chamfer face in a clean line. No filing or glass papering should be necessary if a sharp chisel has been used. Although beginners find a stopped chamfer a difficult thing to cut, they will never do one successfully unless the utmost insistence is laid on the correct method of holding the chisel, the correct stance, and the use of a wide-bladed chisel with a true and flat face.

Wide wagon chamfers are best cut with a flat-faced spokeshave, a round-faced tool being used for the hollow curves where the chamfer runs off to the edge of the stuff at each end. The disadvantage of a spokeshave for narrow chamfers on small stuff is the impossibility of seeing exactly where the cutting edge is going, and the difficulty of keeping the tool in one plane on a narrow face.

Additional decorative effect may be obtained on members by the judicious use of stopped chamfers on opposite edges, when it is desired to give the impression of a boss which recurs

at regular intervals. By stopping them in line, and then starting again in line with each other, a small portion of the original full face of the member concerned is left untouched, and the four end cuts into the pairs of chamfers from this face give the appearance of a boss.

Inlaying.—Great care is needed in the planning of this form of decoration. If material of any width and of $\frac{1}{8}$ in., or thereabouts, is used, shrinkage will take place after a time to the detriment of the work as the joints will open. For this reason inlaying is best restricted to the use of lines, or of units cut from thicker saw-cut veneers.

Exterior edge lines may be cut with a cutting gauge, or a steel shoulder or block plane. Interior lines are best done by gauging carefully to prevent tearing of surface fibres, and then cleaning out to the depth with a scratch stock used from a trued, straight edge of the stuff. In gauging, a test should first be made on waste wood to enable allowance to be made for the width of the gauge line itself, which may be quite appreciable with a wedge-shaped cutter in softish timber.

Lines in fairly spongy timbers such as some types of walnut will give trouble when laid in the grooves and glued, particularly at the ends which will not "lie down." This happens when only one face is glued causing it to swell sufficiently to curve in the length. It is advisable, therefore, to damp the line first, or to glue all faces before laying with the hammer peen.

Care should be taken to ensure that, when laid, the line is projecting slightly above the surface of the groundwork, so that it may be cleaned off flush after the glue has set. If too much is left to project, it is awkward to clean off later and there will be a danger of splintering and tearing out even though a sharp scraper is used.

Units, or varied shapes, should be mounted first on paper, then scribed round and inlaid. The difficulties of this process, combined with those of getting the parts level with the groundwork to leave both a slight projection and enough inlay for strength, make it a method of doubtful value in school workshops. Where it is desired to introduce an arrangement of units, it is best so to design it that the inlaying may be done in small parts, grouped but separate. In this way it may be done by direct tool cuts with a scribing gouge and the same tool may be used at times for both the ground cuts and the inlay units themselves.

In finishing any kind of patterned inlay it is safest not to use the scraper at all, if possible, but to rub the surface down with glasspaper wrapped round a cork or wooden rubber. The reason for this is that the scraper, in the hands of an inexperienced worker, will tend to jump the small areas of harder woods in the inlay, where such may occur, and to scoop out small hollows in the adjacent groundwork in consequence. These inequalities of surface will not be very obvious until the work is polished, but they will then spoil the whole appearance of the job. The glasspaper method may take much longer, but it will at least ensure a flat, true surface in the end—provided that the rubbing block is used and not the finger tips, as is often the case.

Veneering.—A great deal of prejudice still exists against this perfectly legitimate and very beautiful form of decoration. To some extent it is understandable in view of the widespread misuse that has been made of this method during the last few years. Thoughtless application, exaggeration and lack of good taste or restraint have characterised the commercial product since the introduction of laminated board and plywood offered the perfect groundwork. The possibilities of cheap mass production of a type of furniture which previously had been comparatively expensive, opened a competition in which the aim was to get an effect more startling and unusual than that reached by any other means. This was helped by the discovery of clever methods of handling veneers to get results that were well-nigh

impossible when working along traditional lines. An example of this is the use of the pneumatic tube in which tremendous air pressure is exerted on the veneer while it is damp to lay it, cross grained, on to a sharply curved quarter-round ground for use as a corner filling between two adjacent carcase surfaces, where a rounded edge is wanted.

It is claimed too by some critics that veneering is only "imitation" of the real thing. But this is far from being the truth, for there is nothing synthetic about veneer. Its whole appeal depends upon the beauty of the natural colouring or figure of the wood itself—if we except the very few cases of dyed woods—and therefore there is no reason to condemn a piece of stuff for being only $\frac{1}{32}$ in. thick when it would be accepted as beautiful by the same critic were it $\frac{1}{2}$ in. thick. In any case, it would be impossible at the present day to produce furniture in the entirely solid with the same decorative qualities possessed by certain of the well-designed products now obtainable at reasonable cost, for it is almost impossible to get properly seasoned timber. Furthermore, many of the very beautiful woods which veneering has made it possible to introduce cannot be obtained in sizes large enough for any constructional work in the solid.

Veneering as a craft has a definite historic background. It has two hundred years of traditional practice in England alone, from the time when it was imported as an already fully fledged craft process. Its popularity has fluctuated considerably during that time, but if we examine the causes of the periodic outbursts of condemnation we find that in every case they follow upon the same provocation; viz., the exaggerations of the moment. The surest way to such unpopularity in this country is the introduction of any kind of flamboyance that is exploited for any longer period than is necessary for the temporary "craze."

The position of veneering in relation to constructional woodwork is summed up aptly by Mr. John Gloag, in his book *English Furniture* (A. and C. Black), in which, speaking of the early part of the eighteenth century, he says, "The veneering of panels was practised, not (as is now often supposed) to provide a cheap way of covering up a cheap and possibly nasty wood with a thin layer of something more elaborate, but to gain the fullest possible decorative value from the beautiful marking of such a wood as walnut. Veneering can be carried out only by expert craftsmen. It requires time and care and achieves ornamental results that would be impossible if solid panels of wood were used."

Whilst it is true that there are certain processes of veneering and certain types of veneer that only a skilled craftsman can handle with any success, the more straightforward processes and types are well within the powers of the senior school pupil. Elaborate figured quarterings are hardly likely to be needed or to be attempted, nor would there be chosen for comparative beginners, lacy and difficult burrs, which necessitate plugging and stopping, and extreme skill in laying. The smallness of most of the work and the straightforwardness of its construction makes a suitably chosen veneer, carefully applied as regards the design, colour and figure, a great asset in the scope of the course as well as a valuable contrast in method, style and finish to the other solid jobs.

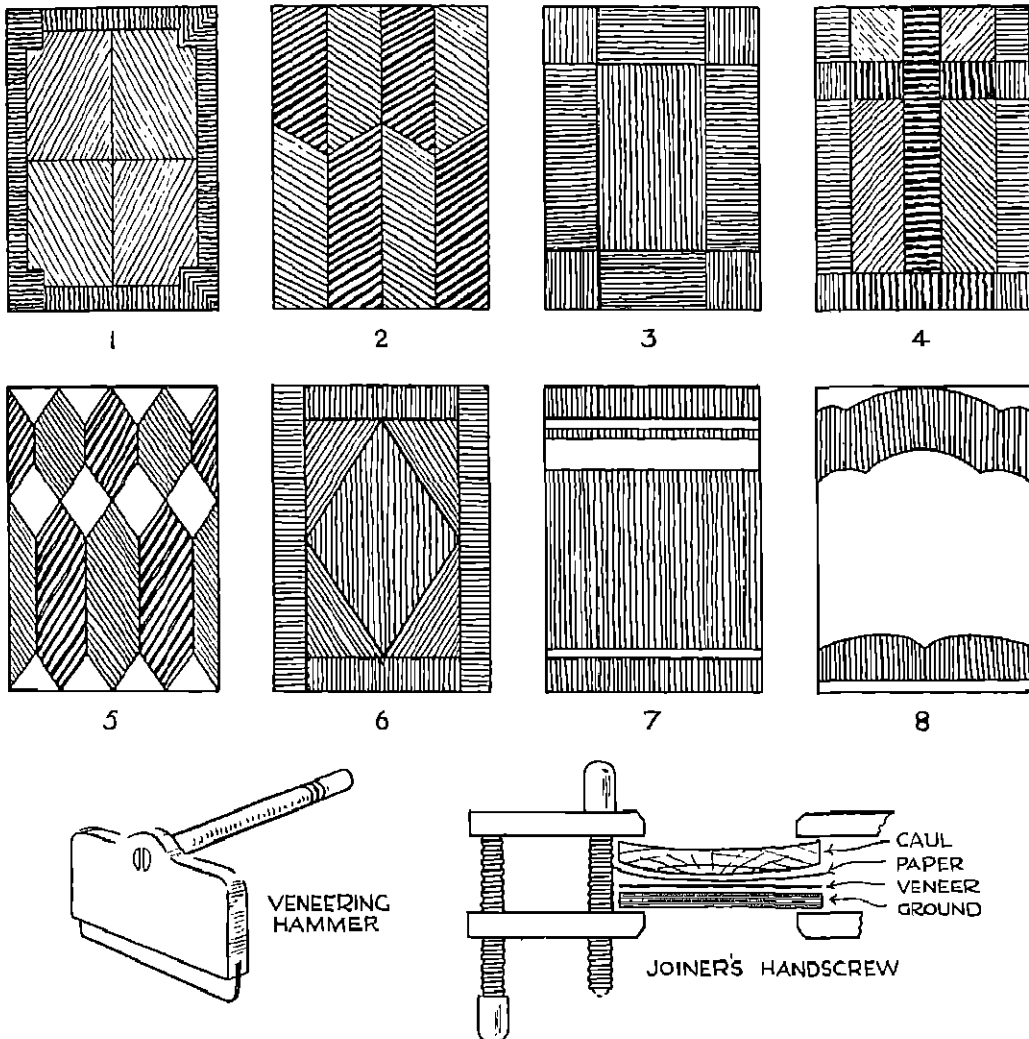
If for no other reason, the boys should learn something of the origin and fundamentals of a process which leaves its mark on nearly everything connected with the furniture trade of the present day, and by the results of which the pupils are surrounded every day in their own homes. Veneering has come to stay and with the innovation of plywood and laminated board it is useless to ignore the whole business as though it did not exist. It is far better to explore the possibilities of the work and to examine it as a method well worth studying in the hope of avoiding the many pitfalls of its misuse.

Veneering in the school workshop.—There are two methods of working applicable to the type of job undertaken in the school workshop where the veneer press is out of the question and the work has to be done by simpler means. The first factor to be considered in deciding

the process to be used is the thickness of the veneer: the second is whether the surface to be veneered is to be finished plain or patterned.

The commonest form in use to-day, and probably the best for the instruction of the beginner, is the knife-cut, so called because of its thinness and the fact that it is cut with a sharp knife and straightedge, and not with a saw. The saw would splinter such thin veneer and a chisel would split it. An old ground-down table knife (not of the stainless steel variety which will not form or keep an edge) is the best tool with which to work.

Knife-cut veneer may be laid with the veneering hammer, which is more like a squeegee with a metal blade. The blade should be of brass and not of steel, for if the latter is accidentally allowed to rest on oak or walnut veneer for any length of time whilst the veneer



TYPES OF VENEERED PANELS AND DOORS

- | | | |
|------------------------------|--|----------------------|
| 1. PLAIN QUARTERED | 2. HERRING-BONE | 3. CHECKERED |
| 4. QUARTERED AND CROSSBANDED | 5. DIAPERED | 6. DIAMOND-QUARTERED |
| 7. INLAID | 8. OVERLAID; CUT-IN, AND LAID IN ONE OPERATION | |

is damp, it will cause a black discolouration that cannot be erased. The same precaution must be taken in using the steel straightedge with which it is customary to line up and cut the edges of the veneers.

Method of laying a plain panel.—To keep the glue workable, many teachers advocate the use of a hot iron when laying a veneer, as explained later. This plan is sometimes necessary on a small area that is giving trouble, but the danger of its use by inexperienced workers is that the glue underneath the veneer will be burnt by the heat and so lose its holding properties.

The following method for boys will be found easier, safer and satisfactory for all but a very few difficult veneers. The stages in working are as follows:

1. Examine the ground to be veneered for any cracks or holes. Fill these with a paste of glue and sawdust, or, if of any considerable size, inlay a piece of the same stuff as the ground and clean off flush. Even small flaws if not treated first will cause trouble by collecting air bubbles.

2. Tooth the ground with the toothing plane until the surface is well and evenly roughened in order to give a better hold for the glue. Work inwards from the edges, otherwise these will be splintered.

3. Take the sheet of veneer—which has previously been left damp for a few hours and is now beginning to dry but is still quite pliable—and cut it with straightedge and knife to a little larger all round than the ground.

4. Prepare, ready in position, the following:

- (a) Some clean rag.

- (b) Freshly prepared clean glue ready for use and not too thin. (The consistency of the glue should vary with the weather conditions and the temperature of the workshop. The exact thickness, which will be different in winter from that in summer, can be determined only by practice, but it should be of such a consistency that it will drop cleanly and easily off the brush and not run off as a watery stream, or drop off in large sluggish lumps.)

- (c) Some hot water.

- (d) An ordinary household iron with a clean face stood on a gas ring and kept at such a steady heat that when passed slowly over a waste piece of the same veneer it will not immediately char the surface. Experience also has to decide the correct heat of the iron.

- (e) Sharp knife, straightedge, large trysquare, V-hammer.

5. Using a large brush, quickly glue the ground all over, working the glue in to the toothing thoroughly but quickly.

6. Lay the veneer down on a sheet of waste paper and glue quickly the side that is to be placed on the ground.

7. Lay the glued veneer in position on the ground, leaving a little waste projecting all round.

8. Take up the veneer hammer and, working each stroke away from the centre, rub down very quickly so that the veneer is held in position and prevented from slipping.

9. Rapidly glue the outside of the veneer.

10. Applying a steady, heavy pressure, and again working each stroke away from the centre, zigzag the hammer towards the sides and corners so that the surplus glue can be seen to be squeezed out all round the edges. Firmly cover each part of the panel in this way once.

11. Test the surface for air bubbles by tapping quickly over it with the finger nail, when any such places will immediately be evident.

12. Work over once more with fairly heavy pressure. The panel should now be laid evenly and firmly. If it is now found that any part will not go down, pass a pad of damp hot rag—

not wet—over the part concerned. Immediately pass the hot iron once firmly over, and hammer out as before.

Note.—If too much water is used, the veneer at that part is swelled, and thus made more difficult, if not impossible, to lay at once as it will already be tending to cockle. Also, if the iron is too hot the glue underneath will be burnt, when there is no hope of getting the veneer down.

13. When the veneer is laid, turn the panel over on its face on a sheet of waste paper—having wiped off any surplus glue left on the face after hammering—and cut away the waste veneer, holding the panel down firmly on to a flat surface such as an old drawing board. As the veneer is still damp, it will be possible to do this as though it were a piece of paper.

14. Place the panel in a position where it can dry and the glue set slowly.

15. Should this operation not have been carried out on a ground of laminated board at least $\frac{1}{8}$ in. thick, but on thin stuff or solid timber, the reverse face of the panel should also be veneered at once. Otherwise, the veneer on one side only will exert a pull and cast the ground; i.e., cause it to hollow or warp. If knife-cut veneer is laid on stout laminated board this is not necessary, and the already faced side is used for the reverse face of the panel.

If saw-cut veneer of considerably greater thickness is used it is advisable to veneer both sides with the same veneer and at the same time.

It is important to see that plenty of glue is used on both sides of the veneer. If the glue is fresh and clean, it will not discolour or mark the surface at all after being wiped off and after the panel has finally been cleaned up with scraper or glasspaper. The glue is colourless in such a fine film, but its use in this way enables the veneer hammer to slide easily over the surface while the veneer is being laid and it is worked right through the pores of the veneer at the same time to form innumerable little pegs that are one with the ground gluing, thus making by this method a very strong job. Also, glue does not swell or cockle the veneer so badly or so quickly as hot water used for damping, and it renders the use of an iron unnecessary for practically all the ordinary veneers used in a school workshop. A large, quartered door, such as a wardrobe door, can be laid by a practised hand in white sycamore by this method without trouble and without a trace of discolouration on the surface from the glue used on the face of the veneer.

Success depends upon easy and controlled speed (for there is plenty of time if everything is ready to hand), and the right consistency of the clean glue. This method of veneering is easier than the use of the iron.

Laying a quartered panel.—If figured veneer such as French walnut with very strong markings is being used, it is necessary to select four adjacent sheets as they were cut in succession. The portion of the sheet required is thereby almost exactly duplicated upon the other three sheets.

After having been damped and allowed just to begin to dry, as before, the four sheets are placed carefully one on top of the other so that the pattern or figure checks as nearly as possible.

The quarter panel is now cut out from all four at once, by using the sharp knife and straightedge and leaving a little waste all round, including the edges to be fitted for the quartering. The sheets are then turned over and arranged to match up.

The ground having been toothed, a pencil line is drawn across it to join the centre points of each pair of opposite edges. The veneer joints will be made along these two lines.

Taking up the first quarter, glue it together with the ground as for the plain panel, laying it so that the inner edges overlap the pencil lines by about $\frac{1}{2}$ in. Quickly hammer down once to hold.

Lay the next quarter in the same way, overlapping both the waste of the first quarter and the pencil line by the same amount.

With the straightedge and knife, and the pencil line as a guide—it has also been carried across the thickness of the ground—cut through both thicknesses of veneer along the pencil line.

By sliding the blade of the knife underneath them, remove the outside waste strip of the second quarter, and then, lifting its edge carefully, remove the corresponding waste strip of the first quarter.

Hammer down the joint at once.

Lay the third quarter overlapping both pencil line and the first quarter. Hammer quickly to hold in place.

Lay the last quarter overlapping both second and third quarters. Hammer quickly to hold in place.

Continue the joint line already made by cutting through both third and fourth quarters and removing waste as before. Hammer the joint line.

Cut right across through all four on the other joint line. Lift carefully and remove the two underneath waste strips which remain.

Hammer down finally, taking care not to pull up the corners at the centre of the quartering by using undue pressure.

Wipe off the glue with a rag damped in clean warm water.

Turn over on a true surface and, again using the knife, cut waste away from the outside edges of the panel.

Wipe the edges clean. Test veneer for blisters and stand panel away from hot water pipes or radiators to dry slowly.

The caul method of laying veneers.—The caul method has to be used (1) when the veneer is thicker than knife-cut; that is, when saw-cut veneer is being laid; (2) when it is very curly and cockled, making it difficult to lay with the hammer without either splitting the veneer or leaving blisters; (3) when a small and intricate patterned panel has to be laid.

The method for school purposes is as follows:

Prepare the panel or ground by toothing thoroughly as for laying knife-cut veneer. Size it with thin hot glue.

Have ready the following items:

1. The sheet of veneer to be laid, trimmed to leave about $\frac{1}{2}$ in. of waste all round beyond the ground. The veneer need not be damped this time.
2. A sheet of cartridge paper cut to the size of the veneer. There should be no cuts or holes in its surface.
3. The caul, which is a piece of timber about $\frac{3}{4}$ in. in thickness, trimmed to $\frac{1}{4}$ in. larger all round than the ground, and slightly convex on one face.
4. Eight 14 in. joiner's handscrews in wood. These are sufficient for a panel up to about 16 in. longer side.
5. Dovetail saw; gas ring; fresh hot glue; large glue brush.

The caul should be made as hot as possible on the convex side without actually charring the wood. It should be kept hot and ready while the preliminary stages are carried out.

Whether for plain or patterned veneer, it is advisable to have a pencil line drawn across the thickness of the ground at each of the four centre points of the sides, and a pencil mark at the corresponding points on the underside of the veneer. This is to ensure the veneer being laid square with the edges of the ground, a most important point when putting on a patterned or quartered veneer in this way. Having thus sized the ground and prepared the caul, take up the veneer and glue only the side going to the ground, but first damp the other side lightly.

Place the veneer to the ground checking the pencil marks on the veneer and on the edges of the ground to see that they coincide. At this point the glue will be getting tacky.

Place the sheet of cartridge paper on the dampened outer side of the veneer and on that place the heated caul with its convex face to the panel.

Slip on a handscrew at each of the centre points of the sides and tighten just enough to hold firmly. The handscrews must be adjusted beforehand so that they will just slip on over the total thickness of ground, veneer, paper and caul, otherwise the heat of the caul will be lost whilst time is being wasted in fitting them. Care should be taken also to see that the jaws are parallel.

Slide on the remaining four handscrews, one at each corner of the panel, and tighten as before.

Now, tighten up the centre ones finally to the full pressure obtainable, screwing up the inner handle first and the outer handle afterwards. This ensures that the jaws are not riding on their outer ends only, a fault which results in no pressure being applied to the outside edges of the panel, where it is most essential.

The effect of using a convex, heated caul, and tightening the handscrews, is to keep the glue soft (helped by the action of the hot caul on the damp veneer) and to concentrate the first pressure at the centre of the panel, thus squeezing the surplus glue out towards the edges of the ground. As the handscrews are finally tightened up, the edges of ground and caul are brought firmly together with the convexity of the latter giving and retaining intense pressure over the central parts of the panel. Thus, all surplus glue is squeezed out at the edges and air bubbles or blisters are avoided. The pressure is so great that in open-grained veneers the glue is often forced right through to the face, and should the intervening sheet of paper have been forgotten, it is no uncommon thing to find the veneer firmly glued to the caul when the handscrews are finally taken off. In such a case forcible removal of the caul usually proves disastrous to the veneer, if it is found impossible to remove it by giving it a sharp tap on the edges with a hammer.

The handscrews should be left on for twenty-four hours in a warm, dry room.

After taking off the caul, if the paper is found to be glued to the veneer, it may be removed easily by damping it and scraping it off with a knife or the edge of a wide chisel held vertically. Care should be taken not to dig into the surface with the corners of the chisel blade.

When dry, the surface of the veneer may be scraped down lightly with a really sharp cabinet scraper. A blunt scraper or one with a very coarse burr will badly tear the surface. The final finish is given with No. 0 glasspaper wrapped round a cork rubber.

If through any cause such as defects in the surface it is found necessary to do any considerable amount of scraping, a sharp lookout should be kept for the appearance of small, dark spots in the surface of the veneer. These mean that the thickness of the veneer has almost been removed during the scraping—a very easy thing to do when working on one part of the panel—and that the glue is beginning to show through. Once these spots appear the work should be left alone, as any attempt to remove them by further scraping makes them worse and they will rapidly grow larger.

Laying a patterned veneer by the caul method.—When the panel to be laid does not consist of one single sheet of veneer but is quartered in saw-cut thickness, or built up in a pattern of various shapes and of different veneers, the method adopted is as follows:

1. On an old drawing board stretch a sheet of cartridge paper by soaking it in water and then gluing it for $\frac{1}{2}$ in. round the edges. When dry, it will be found to be tightly and evenly stretched on the board.

2. Draw the pattern of the panel or drawer front full size on this sheet taking care to keep clear of the glued edges.

3. Starting at the centre of the pattern cut out each piece of veneer separately, slightly larger all round than the finished size required.

4. Shoot up the edges on a small shooting board, using a very sharp iron plane, until the piece exactly fits the corresponding part on the drawing. Glue lightly in place on the paper.

5. Proceed to fit the adjacent pieces and glue in place in the same manner until the whole pattern has been covered.

Note.—When shooting-up the pieces of veneer work away from any sharp corners and work always with the grain by turning the veneer over when necessary. A roughened edge produces a bad joint on the finished face.

6. The whole design now being built up and mounted on the paper, cut out from the sheet originally drawn upon and proceed to lay exactly as for the plain veneer, not forgetting the pencil marks by which the pattern is squared up on the ground. Use paper, hot caul and hand-screws as before, and when they are taken off later, remove the paper on which the veneer was mounted, as described earlier in this section. The exposed face of the veneer is, of course, the one glued to the ground and not the face which is attached to the drawing.

7. Finish up as before ready for polishing.

The use of crossbanding.—Panels, doors and drawer fronts veneered with a single sheet are usually left flush with the edges of the ground, and without edging lines, bandings or crossbanding. Lines and bandings of different widths are obtainable already made up, but plain crossbanding—so called because the strip of banding is cut from across the grain of the veneer—is usually cut and fitted on the job by hand.

The edges of a patterned veneer or a quartered panel are generally finished with a cross-banded margin, varying in width according to the size of the panel. This, in turn, is edged with line of square section, normally about $\frac{1}{4}$ in. in thickness, which provides a strong edge with the grain running its length and protects the edges of the crossbanding from being splintered.

To crossband a veneered panel or lay a made banding.—When the glue is set and the hand-screws have been removed, the edges of the panel are trued up to the finished size. If any considerable amount of planing is necessary, and it was decided beforehand to crossband the edges, the veneer should have been left set back from the outside edges of the ground all round.

The panel being ready and finished to size, a cutting gauge is set to a fraction of an inch less than the width of the ready-made banding to be used. The panel is then gauged round from the outside edges until the veneer is cut through cleanly.

The cutter of the gauge is now reversed (the flat face of the cutter has been turned outwards from the stock for gauging the width of the banding) and the gauge is set to a fraction less than the thickness of the banding. A fine gauge line is now run round the panel edges from the veneered face.

The next step is the removal of the waste veneer which is to be replaced by the banding. This is done by heating a flatiron on the gas ring and placing for a moment or two the straightedge of its sole over the waste veneer. It will then be found possible to lift off that portion of the waste strip with a knife blade slid underneath it. The iron is moved along and the process repeated until all the waste is removed.

Unless fairly thick saw-cut veneer has been used, it will be found that the gauge line on the edges of the panel is still visible, as the banding is considerably thicker than the average knife-cut veneer used, and this makes it necessary to sink the ground a little between the gauge lines until that on the edges is reached. If the banding is put on immediately the waste veneer is taken off, a great deal of the former will have to be cleaned off finally to the level

of the veneer, and this is a difficult and dangerous practice as the banding is easily splintered at the corners, whether mitred or not.

The ground, then, is sunk to the gauge line with a sharp shoulder or block plane and the banding is tested in place by shaving until it just projects a fraction above the surface of the veneer. At the same time a good joint must be made between them both.

When it has been fitted right round the edges, the two longer and opposite sides are fitted to length, the ends being mitred with a sharp chisel. They are then glued in place and are held in position tight up against the shoulder of the veneer by winding a long length of wide tape round and round the panel, pulling each winding tight across the edges of the banding, finally tying up and leaving until the glue has set.

After this is done and the tape is removed, the two ends are fitted, glued and taped round in the same way. When set and dry the panel is ready for scraping up, but the greatest care is needed in cleaning off the corners. The scraper should be held steady at the inner end whilst the outer end is swung round to scrape as far as possible across the mitres.

Crossbanding.—True up the panel edges as before. Gauge round for the width of the banding with cutting gauge on the surface only. Remove waste veneer from margin as before. Clean up the ground for banding.

As the crossbanding is of the same thickness as the veneer already on the panel, and may be cut from the same sheet, it is obvious that there is no need for any gauging on the edges of the panel. This time the original surface of the ground is being used.

Cut from the sheet which is damp a strip of veneer a fraction wider than the margin allowed. Cut at right angles to the grain, and do not attempt to lay more than 6 in. or so at a time. By using the knife and straightedge on knife-cut veneer, a straight, clean edge is obtained at once. With saw-cut thickness cut out with the dovetail saw against a wooden straightedge (using this to hold down the strip being cut off in order to prevent splintering) and shoot-up in short lengths on the shooting board used for the patterned veneers so as to get a clean, sharp edge to fit against the gauged veneer.

Damp the top surface of the strip to counteract the tendency to curl up when the glue is put on the underside. Glue the under surface and lay with the cross-peen of an ordinary Warrington hammer, working in short movements along and diagonally across the strip until it is firmly held. Do not mitre the end from which a start is made but lay the strip right along to the outside edges of the ground.

Fitting the joins as progress is made by short lengths, work along until a corner is reached and carry straight through to the edge at right angles. Then start the end from the side of the strip just laid.

If mitring is necessary for any particular reason overlay the two strips, square ended, and then cut through both together with the knife removing the waste from underneath one side of the mitre and hammering down.

Continue to work round in this manner until the edges are finished. On a flat surface turn over and trim off any waste.

If using the square-ended finish for the crossbanding, which is stronger, see that the bandings on the upright edges of the panel—not necessarily the longer edges—are carried right through, on the same principle as the stiles of a door. When dry, finish off as before.

To inlay a line between the veneer and the crossbanding.—Sometimes it is desired to work in a narrow line against the veneer before adding the banding. To do this take off the waste veneer from the margin, as before, including the width of the line itself.

Cut one length of line and mitre the corners to fit one side of the veneer. Glue in place and hold firmly in position by tapping in veneer pins at fairly close intervals against the line

and bending them over slightly to ensure pressure against the line by holding it tightly against the edge of the veneer. Only tap the pins in about half-way.

Work round the remaining edges in the same way and then leave to dry. Next pull out the pins and see that no glue remains on the edge of the line or the ground, after which the remaining banding is laid as before.

To edge a veneered panel with square line.—Normally, such a line is about $\frac{1}{8}$ sq. in. in section—what is known as No. 12—but it may be of any thickness and may be natural colour or dyed. Its purpose is partly decorative and partly to give a stronger edge protecting the veneer.

The panel is veneered and finished accurately up to the outside edges all round, any waste or glue being removed.

A cutting gauge is set to a fraction less than the thickness of the line, with its cutter so fixed that the flat face is towards the centre of the panel thereby ensuring a square-cut shoulder for the line to fit against.

The panel is held down firmly with the left hand on the bench, or with a handscrew, and is gauged steadily round the edges until it is judged that the depth is sufficient. It is then placed in the vice (with protection for the veneered face) and gauged round the edges until the waste line is loosened and can be removed.

It will be found that the small rebate thus formed will not be quite true in section as a right angle. To fit the line properly and prevent wobbling, which would show an ugly glue line on the surface, it is necessary to clean out the rebate with the chisel or block plane until the line fits accurately.

When this is done, fit the lengths of line for the two longer edges and mitre or leave square-ended as desired. Glue them and rub into place. Tape round immediately, as for made banding, taking care that the extreme ends of each line are covered by the tape, as these ends tend to rise from the ground.

When dry fit the remaining sides, glue and tape also. Finish as before.

To lay a veneer with curved joints.—Using damped veneer as before, lay one section with the hammer as for quartering.

Overlay the adjacent section, or sections, as before.

Cut through along the curved join using a zinc template cut to the shape of the curve required and a sharp knife.

Lift up the edges of the veneer and remove the waste.

Hammer down and finish as before. (Allow plenty of waste for overlaying.)

Note.—After laying damped veneers with the knife and hammer by the methods stated above, it is advisable to glue strips of strong brown paper along the joints to ensure their being held close, while drying and the consequent danger of shrinkage take place. It is necessary to dry the veneered work slowly, as otherwise the veneer will dry and shrink before the glue is set, with the result that the joints are bound to open and spoil the work. This precaution is particularly necessary in hot weather or in overheated workshops.

GENERAL NOTES ON MORE ADVANCED WORK

The ground.—In consideration of expense it is often necessary to veneer on a cheaper softwood for school purposes. There is really nothing against this practice providing that either yellow pine or American whitewood (Canary pine) is used.

Veneers should never be laid on resinous timbers such as deal or pitch pine, or the work is liable to be ruined after a short time. The ground should be free from knots left as such

and the timber should be as well seasoned as possible. Also, it is bad practice to lay a veneer over any through dovetailing, as after a time a certain amount of shrinkage is bound to take place in the thickness of the stuff and, however slight it may be, the ends of both tails and pins will begin to show through the veneer—the receding of the side grain between them, pulling the veneer with it, being made most obvious by the highly polished surface. In bad cases the veneer may actually be split in several places.

Where it is wished to include veneering with a dovetailed carcass or box, the secret dovetail should be used or the covered lap dovetail with a line edging. To bring the covered lap dovetail right forward to the face of the adjoining member, instead of using the secret dovetail or inserting a line, is as bad as using the through dovetail joint, as a long narrow strip of end grain has to be veneered over. When the adjacent member shrinks slightly this end grain is left projecting a fraction of an inch and, as it is too narrow for the veneer to bend round the latter, is split away.

The best ground for veneering upon is Honduras mahogany. Oak and American walnut are both suitable, but the so-called "satin walnut" is most unreliable as it shrinks and casts so readily.

As thoroughly seasoned solid timber is almost unobtainable for school use, the finest ground on the whole is the gaboon-faced laminated board. The surface is true; shrinkage is practically non-existent, and the board will keep flat as one side is already veneered with either gaboon or another hardwood.

Where it is impossible to use the built-up laminated board, as for instance in curved work, the ground should be built up of strips of well-seasoned stuff glued edge to edge, the alternate strips being turned over to ensure that any pull is neutralised. This is necessary as the outer surface of the timber away from the heartwood shrinks more rapidly than the heart side, hence if a piece of solid stuff were merely sawn into strips and glued up again, there would still be curvature away from the heart side.

A slight curvature is obtainable on comparatively narrow widths of stuff or built-up board by making a series of closely placed saw cuts almost right through the stuff at right angles to the direction of curve. Hot glue is quickly worked in whilst the sawn side is flat; then the ground is gently worked on to a shaped template, former or mould of solid stuff curved to the exact shape of the inner face of the ground and held in place by being pinned through the waste at each side into the former.

This method, though quick, is suitable only for jobs in which the end grain of built-up stuff will not be seen and therefore does not have to be veneered on the curved edges. If solid stuff is used this objection does not arise and the curved edges may be veneered afterwards in the usual way.

Veneering curved work.—Although this is a problem that does not often arise in the senior school, there are bound to be times when a curved drawer front is needed, or a curved carcass top which it is desired to veneer. For such work cauls are essential and they are applied with handscrews, as described earlier, the only difference being that the caul must fit the curve at every point on the surface. For concave surfaces hot sandbags are very useful as they apply the pressure evenly all over. They should be about 2 in. to 3 in. thick and covered with a thin strong material such as calico. If heated in an oven they will retain their heat for some time.

Of course, such methods are unnecessary when veneering the edge of; e.g., a circular table top with cross-grained veneer, as the curvature will be gradual and will not be along the length of the grain. Such work may be carried out quite easily with the hammer in the usual way.

If the curvature is slight but over a fairly wide surface, the veneer may be laid with the hammer also, one end being held in place with handscrews and a strip of waste stuff until the whole is laid. These are removed for the final working. Again, if a drawer front with a vertical face in section but a curve along its length is to be veneered, this may be done straight away with the hammer, but if the section should be a sharp, concave curve with perhaps a curve in the length as well, cauling will be essential.

Work that is too elaborate or too difficult should not be attempted under ordinary circumstances by lads who have had only a bare minimum of training in this difficult art. A simple and straightforward job well veneered is worth far more than any elaborate piece of work which is poorly done and badly finished, and the chief difficulty in curved work of the more advanced type is not so much the laying of the veneers (in which the beginner might be lucky) but the finishing of the surfaces afterwards in preparation for polishing (in which finishing he certainly will not be lucky).

Intarsia.—This section of veneering practice is not common in school work. It might be developed to advantage if sufficient care were given to the design of panels treated in this way, but unfortunately most examples of this type of work are badly chosen and wrongly used.

For its particular charm this work depends upon the use of the natural characteristics, figure and colour of the woods chosen for the various parts of the panel, with their arrangement in the pictorial sense for contrast of colour and tone, and as part of a picture carried out in flat areas of light, dark and colour. Simple effects are the best. The brightly dyed woods sometimes offered for intarsia work should be avoided.

Saw-cut veneers are used. With a range comprising plain and burr walnut, sycamore, greywood, amboyna, Macassar ebony and zebrano practically any desired effect can be obtained by using three or four of these at a time in any one panel.

According to the number of woods being used the pieces of veneer should be laid one upon the other with a thin piece of paper very lightly glued with thin glue in between. The drawing is lightly glued on to the top thickness, after which the shapes are best cut right through the lot with a fine fretsaw. Any particular direction of grain on individual pieces is arranged for when the various thicknesses are put together.

The result is like a jigsaw puzzle. The separate pieces are fitted together and glued on to a sheet of paper. When the panel is built up in this way it is laid on the ground with a caul in the same way as a patterned veneer described earlier in this chapter.

Panels decorated in this way are suitable for tops and sides of boxes, and in the right surrounds for overmantels. The latter have largely gone out of fashion and the best use for such panels in a well-designed room of the modern type is found when they are suitably framed and used as wall decorations as an alternative to pictures. For such purposes they should not be highly polished. A much pleasanter finish, in keeping with their position and the remainder of the room, is obtained by oiling only. Oiling brings out to the full the individual characteristics of grain and figure while increasing the contrasts between light and dark woods; it provides also a protective finish which does not obscure fine details.

The decorative use of constructional features.—Constructional features such as through dovetail joints, oak pegs, and curved stretchers along with through tenons left projecting and dry-wedged on the outside, form the most sincere and valuable decorative units of all. They are most suited to the nature of oak and their success depends entirely upon their use only in positions where they add to the structural design and strength of the job.

The nature of oak, by association with its historical uses and by virtue of its own characteristics, demands simplicity, strength and comparative plainness in the design of any job for

which it is used. Elaborate or delicate veneers, inlays or marquetry, or a glassy finish will all look out of place and may even look ridiculous if applied to an oak piece. Properly used, there is a dignity about oak that suffers from any additional fripperies and therefore the greatest care should be taken when attempting to decorate it.

By using the through dovetail frankly and openly at the corners of carcase or plinth; by grouping the pins in pairs or threes; by allowing them to project a short distance—putting small chamfers on their edges—or by dividing up their depth alternately; by rounding off the edges of a through dovetailed carcase; by bringing the tenons right through and chamfering their edges; by mortising them in turn and dry wedging them on the outer face of the job; by the right use of chamfers accentuating the constructional lines: by any of these methods most in keeping with the nature and strength of the timber, a suitable decorative feature is added. Restraint is necessary, as to use all these devices on any one job in every possible place will neutralise their value and obscure the aim.

It is not advisable to copy devices from the style of any of the great oak periods of English furniture and general woodwork. To apply methods and decorative features of any of the period styles to modern woodwork designs is useless. As a rule such decorations appear as anachronisms; seldom are they in keeping with either the rest of the job or the surroundings, while often they add a flavour of imitation "Tudor" to the job. In any case, to copy so slavishly is to avoid the issue—that furniture of the present day should be designed for the present day in which it is to be used. Briefly, there is no reason why the twentieth century should not have a distinctive style of its own; one of good solid workmanship based on an understanding of sound principles of design allied to the needs of the average small house, and with an understanding of the qualities of timber used. This does not prevent us from benefiting by the experience of past craftsmen, or from making use of any devices handed on by them: it simply means that we should endeavour to produce our own designs to suit our own conditions, timbers, purses and skill. Neither does such an acceptance of our own responsibilities compel us to go to extremes and to indulge in the unrestrained or careless use of new materials such as plywood, glass and chromium plate.

If our children can be taught to understand the first principles of good design and to work always from those principles in an honest manner, a proper and individual style will develop as the core of the main mass of production. The extremes will eventually die a natural death. There are signs that such development is already taking place in many activities and in many parts of the country. The style is bound to be individual as a type, for unconsciously the worker designs the best work in a manner which is coloured by the needs of the times in which he is working.

Many of the devices used when working in oak may be applied equally well in walnut, but not all of them with equal success. Much depends upon the need or otherwise for the use of veneer. Through dovetails, chamfers, pegs and through tenons may all be used with pleasant effect on a walnut job. If, however, any part of it is to be veneered, it is better that the purely conventional style of construction, as for mahogany, be used, so that there shall be no confusion either of styles or appearance.

In the same way a plain walnut job constructed on the oak lines is better oiled out—a process which brings out the full beauty of the figure in this timber far more effectively than does a high polish—whereas should the job be a heavily veneered one in figured walnut, the normal French polish may be used. It is a curious thing that the highest possible glassy finish should always be so much in demand, when it is neither so beautiful nor anything like so permanent as that obtained by either waxing or oiling of the surface. It is a matter of regret that this demand makes things so easy for the manufacturer of shoddy furniture, some of which is literally almost held together by a brilliant, glassy brush polish.

Handles, knobs and pulls.—As has been remarked already many sound jobs are spoiled by the application of totally unsuitable handles or pulls to the doors and drawer fronts. As a rule, it is not so much a matter of lack of knowledge as of thoughtlessness, but to an observant eye it may have the same devastating effect as odd hose with a golfing kit.

Roughly speaking, small round knobs such as shutter knobs or light peardrop handles will suit a delicate job in mahogany, walnut, etc., veneered or otherwise. Wood pulls of a plain form assist the general effect on an oak or plain walnut job. Some forms of oxidised or bronzed handles look well on larger and heavier pieces in mahogany and walnut but seldom look right on oak. For a very limited range of style in natural oak a burnished steel handle will look well, but unless it is very carefully placed in relation to the surroundings it will appear theatrical.

Chromium-plated pulls and most of the Bakelite varieties never look so satisfactory. They either look out-of-place or blatantly "flashy," probably because, unlike brass or steel, they are so obviously a non-traditional, unassociated material. It would be wrong to condemn them wholesale. They are a product of the age and deserving of consideration, but so far their use has not been as a whole for the betterment of design and finish. It will take time to adjust the new materials to the needs of the job and the styles of the period. For the present therefore it is suggested that they can be omitted, except in special cases, from the requirements of the school workshop.

CONSTRUCTION AND PROPORTION

THE now somewhat hackneyed phrase "fitness for purpose" indicates the starting point from which to begin the design of any article of furniture. Also, in nearly every case some of the main sizes or dimensions are fixed by necessity. The height of a writing desk or dining table will be 30 in. The seat height of a "hard" chair will be 17 in. or 18 in. In the average small house of the present day the sideboard will be unlikely to exceed 4 ft. 6 in. in length. Bookshelves are graded in height from between 7 in. to 12 in. on the average. The modern dressing table is low-built to permit of its user being seated. Similarly the dimensions of many common household articles have been fixed by custom arising out of experience.

Construction, however, depends mainly upon the material used, and is now partly traditional and partly an adaptation of new materials such as plywood and Bakelite, glass and metal.

The design of any one piece thus implies the harmonious welding together of these different factors to give efficient service with what is called "good proportion." Harmony of line and form, which is evident in any well designed piece of craftwork, has nothing to do with incidental ornamentation, and no amount of ornament or decoration can rectify errors of construction or proportion. Generally, the addition of ornament will merely emphasise the errors.

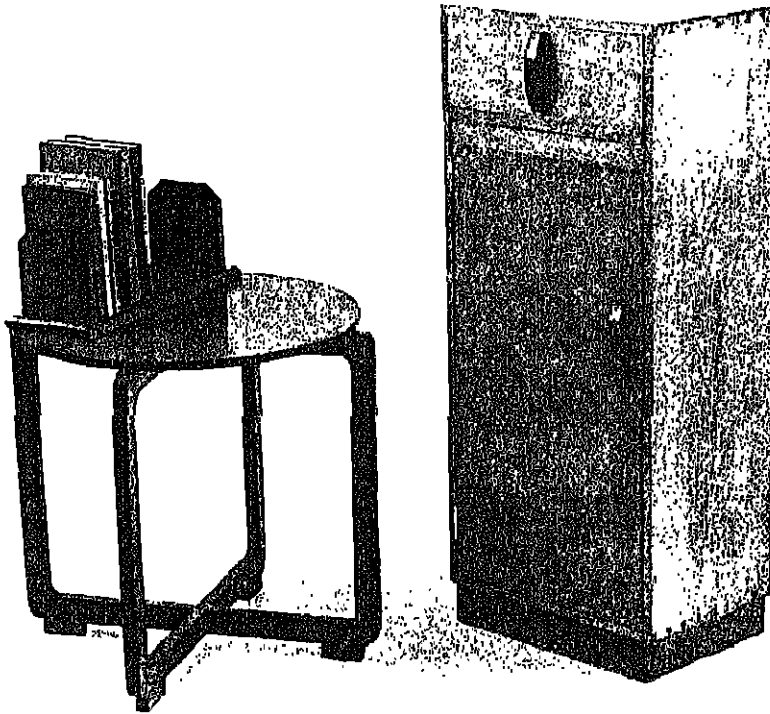
Whilst there are certain rules covering the proportions of rectangles and the sub-divisions of areas, they are of no great value in school work in which it is essential to get the pupils to estimate sizes and proportions and to use their own judgment as to fitness, based on direct observation of good work or on the study of photographs.

The only real test of a piece of furniture is whether or not the design "looks right" when it is finished and particularly in its final setting. The finest piece of modern work would

look anything but right in a period setting. The necessity for studying the whole scheme into which the piece is to fit has already been stressed on an earlier page and is again emphasised.

This ability to visualise the finished piece as part of a scheme, and so to plan or design it that it will look right when finished, can be acquired by the average individual only through constant observation and practice. Therein lies much of the value of the teaching of handicraft in the school.

Units of design.—The diagrams 1 to 9 show the fundamental constructions which with variations form the units of design of any ordinary piece of furniture.



BOOKRACK, COFFEE TABLE AND BEDSIDE CUPBOARD

The footing (No. 1) is really the same in purpose as the stool (No. 2) and the ordinary table or chair. Its job is to support something and to raise it from the ground level.

The box or carcass (No. 3) is to contain something, usually the detailed parts of the whole, as in No. 7.

The flat frame (No. 4) serves several purposes. Its function as a carcass back is to add rigidity and strength to the carcass and to enclose interior detail. Used on the front it becomes a door. Used horizontally or vertically inside the carcass it becomes part of the framing, or a partition. Used by itself it may be a mirror frame or notice board.

The bedside cabinet (No. 5) is a combination of Nos. 1, 3 and 4 with the addition of a drawer (another carcass) and a slight variation in the construction of the door.

The over-all height and the size of the bookshelf determine the outside carcass size in this case. The remainder is then sub-divided to obtain a useful drawer and give a pleasing appearance. Finally, the style of decorative treatment, if any, and finish are considered. The drawer might not be essential, but if omitted the doors would be too high for their width to "look right." On the other hand, if the drawer is made too deep it will look clumsy and the doors appear to be too small and squat. No exact rules can be given in even so simple a case as this and the same applies to the remaining diagrams.

The next diagram (No. 6) is a direct application of Nos. 2, 3 and 4. It represents a radio cabinet but might serve equally well for several other purposes. The speaker aperture needs to be carefully placed on the front panel. It corresponds to the block of lettering on the page of a book as regards the suitability of the margins. The use of the footing in No. 5 and its counterpart, the stand in No. 6, shows how important are these units in the whole design.

No. 7 really consists of two carcasses, one being placed horizontally and used as a footing. The use to which it is to be put—in this case for holding folios, small stationery articles and books—will determine the size of the main carcass and the position of the sub-divisions. No decoration would be needed on this job other than the natural figure of the wood, some chamfering to soften the harshness of the main lines of constructional members, the use of some of the joints themselves—such as through dovetails in the plinth—as a decorative feature, and possibly the addition of shaped wood pulls for the drawers and a wood latch for the doors made in a contrasting wood to that of the rest of the job.

The slight shaping of the top under the filling-pieces is carried out to be in keeping with that of the plinth front. This curve should not be over accented but, apart from its softening effect on the whole design, it really adds four feet to the plinth base.

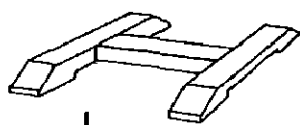
Example No. 8 includes Nos. 2, 3 and 4; and No. 9 is really the same thing repeated three times. This repetition to form a sideboard makes it necessary to alter the detailed proportions not only of No. 8 but of the repeated units as well. A sideboard made up simply of No. 8 three times over would look plain to the point of ugliness, merely because of the lack of variety that would be apparent between the parts. Simple repetition does not necessarily give a good design or a pleasant one. Apart from the fact that the placing of hinges and pulls would be unbalanced, the design is improved by either widening or narrowing the centre section. In this case it is widened to allow of the introduction of a pair of centre doors to balance the pulls.

Restriction of length makes the unit narrower than No. 8, hence another drawer is introduced to keep the doors to a fair proportion.

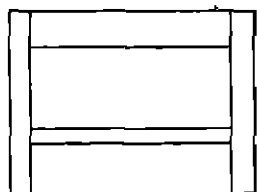
The under framing, or stretchers, may not be necessary from the point of view of appearance, as in any case such framing is seldom seen when the piece is viewed from a standing position. It is necessary for the strengthening of the whole job, as sideboards have to be pulled about occasionally and the contents are heavy.

It will be seen from these few examples that although there is practically no limit to the variation in design of individual articles, the fundamentals are few and remain unchanged except in detail. Special styles and materials are not affected, as the greater portion of this kind of work is still carried out in wood. It is doubtful whether the introduction of expensive materials and processes other than those already involved would be practicable or even desirable in school work, as the scope of woodwork training is so wide and comprehensive.

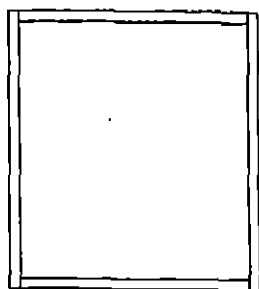
The diagrams show simple straightforward—and straight-line—constructions, and the introduction of curved work will not alter these in essentials although constructional details will be different. At the present day, and for school purposes, little curved work other than



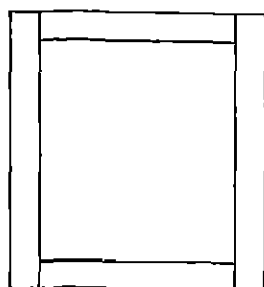
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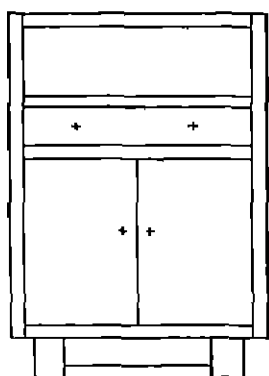
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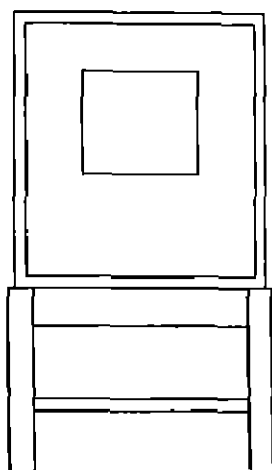
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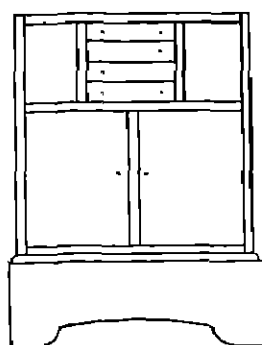
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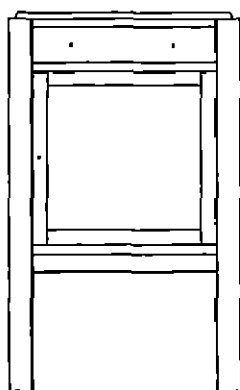
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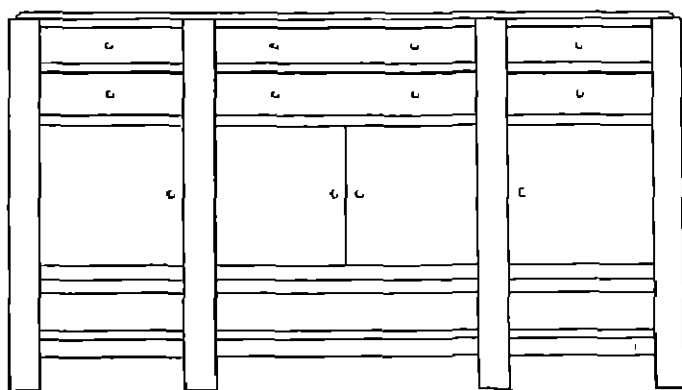
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9

CONSTRUCTION AND PROPORTION

The basic constructions (diagrams 1-4) are shown in varying proportions in Nos. 5-9.

a bow-front drawer or carcass will be required, and even these would be restricted to occasional advanced work in special cases.

To all these and similar examples only one general rule can safely be applied and insisted upon with pupils making their early efforts in design: that styles should never be mixed in the one job. From a suitable selection of photographs of different styles and periods they can note the main characteristics of each and endeavour to apply them to their own particular jobs, when they reach the stage of being able to do so intelligently.

SECOND YEAR: INDIVIDUAL WORK

THE following examples and descriptions are suggested as types of work which may be attempted individually by members of the "A" and "B" groups of various classes. They are *not intended to represent a progressive course, although by careful selection such jobs may constitute such a course.*

As has been stated earlier, this work will not unduly tax the time and powers of the teacher if the preliminary stages have been taught thoroughly. If this is not the case, then it is best to realise at once that individual work will almost certainly be a failure as regards craftsmanship, design and finish. On the other hand, assuming that it can be taught successfully, the added interest given to the work, the rate of progress among the best boys, and the standard reached by many of them, are surprising in view of the time allowance for the subject.

A short description is given of each of the articles illustrated, but in the drawings only the main over-all dimensions are set out as the details of design will vary in every case.

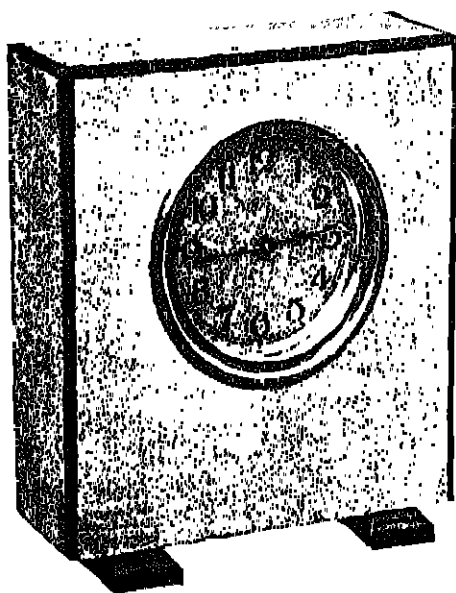


PLATE I. CLOCK CASE

CLOCK CASE.—This job (Plate I and Fig. 1) is extremely useful as a means of teaching a variety of decorative processes. In itself it is a good test of workmanship, being carried out in comparatively thin stuff and requiring a careful finish to be successful. The two most convenient sizes are given in the diagrams.

The one illustrated is of simplified construction for this stage of the course. Two sides front and top, are veneered plain with sycamore and finished with a black line on top and front edges. End grain is not entirely obviated, but is reduced to a minimum, and the danger of damage due to shrinkage to the veneered surface on top is best avoided by double veneering this face, the first laying taking place some time before the second and the remaining parts done together.

American whitewood (Canary pine) may be used for this job. The top and bottom are dovetailed to the sides, as shown, and the front and back glued on with handscrews. It

is not necessary to pin them as well. No door is needed at the back, as the case is made to fit a movement which will extend right through the depth of the case.

When glued up and cleaned off properly, the faces to be veneered are carefully toothed, care being taken not to splinter the edges. The top is veneered first, and trimmed to the edges whilst still damp. Then the two ends are done to cover the thickness of the top veneer, and trimmed to the front and back edges as well. Lastly, the front is veneered (before the circle for the clockface is cut out) and trimmed off.

When thoroughly dry and set, the rebates for the black line are gauged out with the cutting gauge and cleaned out square with the chisel. The line is then fitted in lengths allowing of butt joints at the corners (mitring is weak and unnecessary in black line) and glued in place, being held up tight in the rebates by taping the case round and round both ways. When dry, the tape is removed and the various faces carefully scraped up and glass papered with No. 0 to a suitable finish. Clear wax polish is all that is necessary.

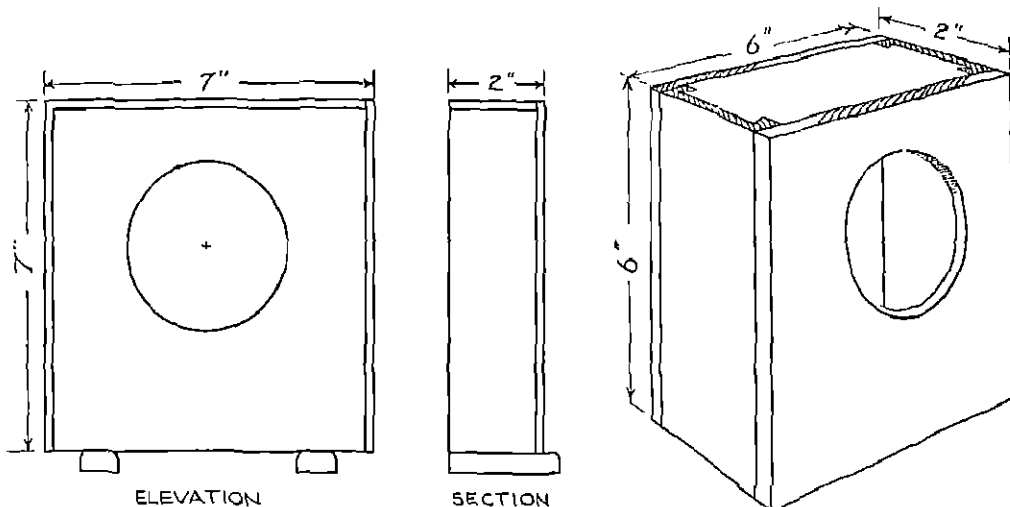


FIG. 1. CLOCK CASE

The two small footings may be dyed black to match the line used, and they are screwed on to the base after finishing the remainder of the job.

Other clock cases are shown in some of the following illustrations but are not dealt with in detail as this description suffices for them all. In one instance the case is not veneered at all, but is cut and worked from the solid throughout and left as light oak, or stained, or as natural walnut as the case may be. Short ends from heavier stuff may be used up in this way, and such ends, which include an assortment of timbers, are usually obtainable by the hundredweight from a (hardwood) timber-yard at a very low cost. These ends are particularly useful for turning exercises for the making of ash trays, bowls, carved paper weights, and door and drawer pulls which would otherwise necessitate the requisitioning of expensive timbers of an unusual thickness, or the building up to the thickness required by gluing together thinner pieces of stuff—a tedious process.

BOOKRACK.—Although one type of bookrack has already been included in the *Intermediate Course*, a number of pupils may wish to make others or to use an alternative method of construction.

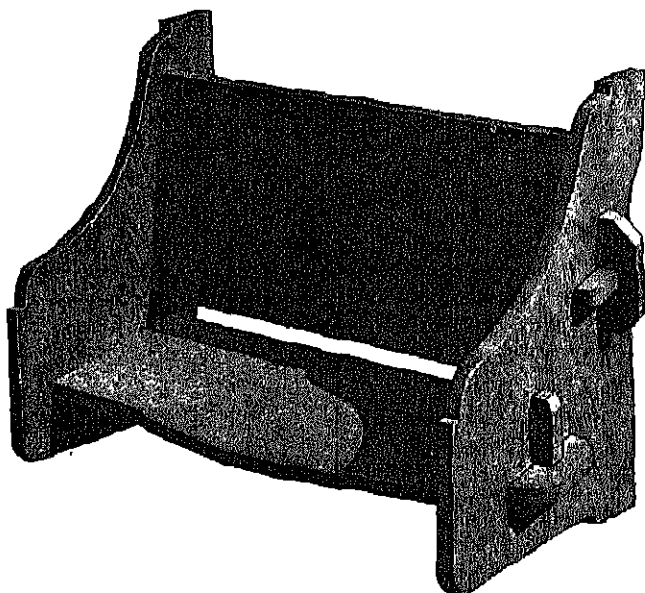


PLATE II. BOOKRACK

The one illustrated (Plate II and Fig. 2) is simple in appearance but needs careful workmanship to make a satisfactory job. The shelf and back are tenoned through the ends, the tenons being brought right through, wedged and chamfered to provide a decorative feature with great strength.

Again, the ends present opportunities for a variety of decorative treatment, excluding veneer. Chamfers, and slight edge shaping (rounding) with protruding tenons, as shown, are the most agreeable additions. If the shelf be housed in, and the stop rail is stub-tenoned, a greater variety of treatment becomes possible. The diagram shows another alternative in which the tenons are brought through but not wedged.

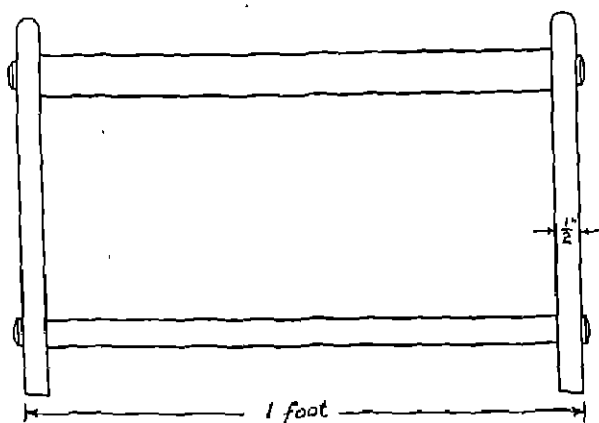
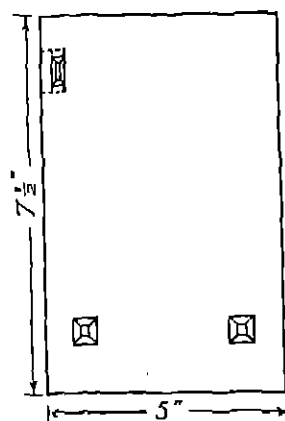
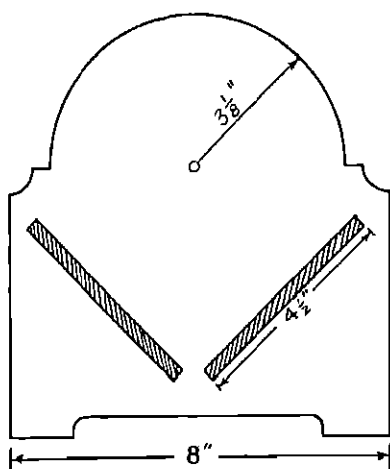


FIG. 2. BOOKRACK

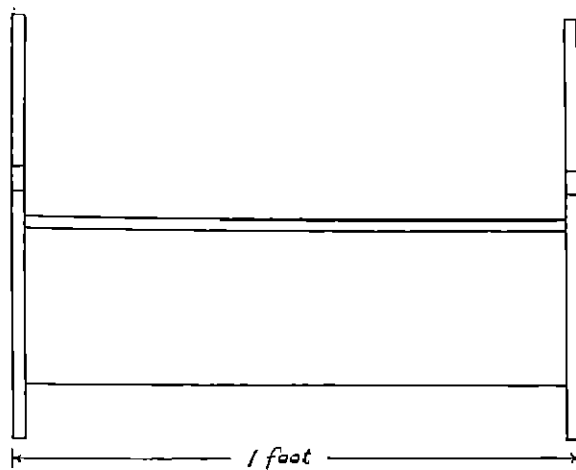


TROUGH BOOKSHELF.—This type of bookshelf (Plate III and Fig. 3) is not so common as the previous one, but provides good practice and, again, requires careful workmanship in order to avoid the splitting down of the ends.

The two sides of the trough are housed into the ends for approximately one-half of their thickness, and should be left slightly separated in the centre to allow dust, etc., to escape. Edge shaping, and chamfering or inlaying, are the only practicable methods of treatment for the ends in this construction.



SECTIONAL ELEVATION



FRONT ELEVATION

FIG. 3. TROUGH BOOKSHELF

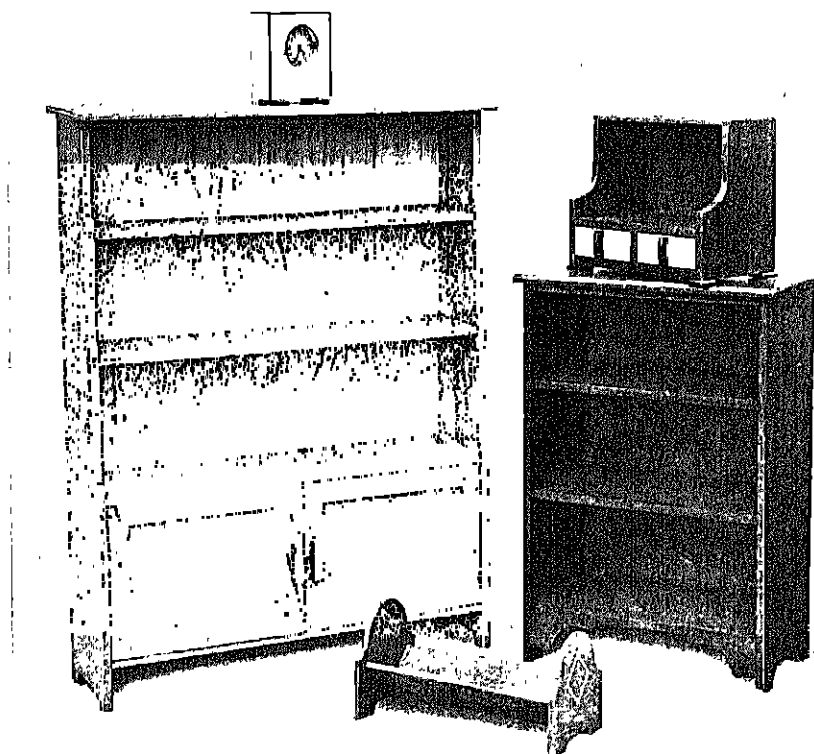


PLATE III. CLOCK CASE, BOOKSHELVES WITH CUPBOARDS, SMALL CABINET, BOOK-SHELVES, AND TROUGH BOOKSHELF

The earlier type of bookrack is preferable to this one as in this case the ends have to be wider and the joints are not so secure. Casting or warping of these ends often takes place and breaks the glue joint in the housing, unless it has been very well fitted. Sometimes the ends are liable to split down after a time.

Half-inch stuff is used throughout this exercise.

CIGARETTE BOX.—This is an exercise (Plate IV and Fig. 4) of simple construction which provides further good practice in veneering and careful finish. At the same time it is not so easy to make as would appear from the diagram, as the squaring of the ends on each piece must be most carefully done if the box is to be fit for veneering.

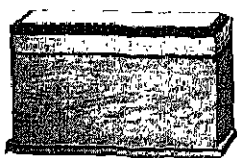


PLATE IV. CIGARETTE Box

The whole box, including the lid, is made first as one piece. After the outside surfaces have been cleaned off true, the box is veneered on top, sides and ends. Then it is sawn through with a tenon saw to provide the lid, and the sawn edges are cleaned up with the iron smoother on both box and lid until the latter fits truly.

To avoid possible damage to the corners, the black line is put in after this fitting has taken place. The base should be finished at the same time.

Finally, the lining is prepared to $\frac{3}{8}$ in. thickness and fitted, being lightly glued into place

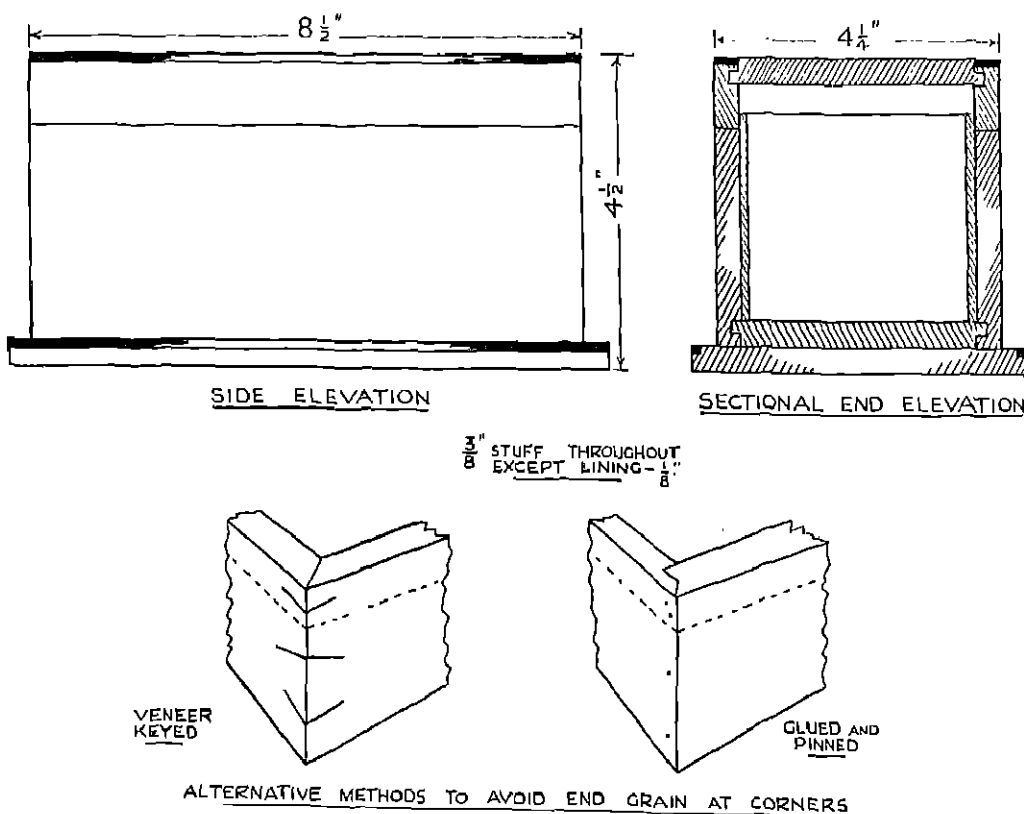


FIG. 4. CIGARETTE Box

and having the corners mitred. It will be seen that the lining is allowed to project above the box edges and is half-rounded on the edge, thus keeping the lid in position. Hinges may be fitted if desired but they are not necessary.

If possible, it is desirable to avoid having any end grain at the corners to be veneered over, and in the diagram two alternative methods of jointing the corners are suggested which are within the powers of the pupils at this stage. The *secret mitre dovetail* is too difficult for a comparative beginner in thin stuff such as is being used in this instance, and the methods shown are quite strong enough for the particular job.

The box is best made in mahogany—which is the most suitable ground for veneering upon—and may be veneered plain in sycamore with a black line at the top edge and on the base, or may be finished with sycamore on the box and Macassar ebony on the lid and base edges. Many other variations are possible, so that no two boxes in the group need be the same in appearance when finished.

A little job like this is worth French polishing, should the conditions be suitable, but if the workshop is very dusty, or other difficulties make it too risky to attempt this, the best finish is a plain wax polish. The boys should know something about French polishing and should attempt at least one piece of such work, but if it cannot be done properly it is worse than useless and is best left alone. It is not advisable to use a so-called "brush polish" for this work as a substitute for the real thing, as these polishes are not sufficiently permanent although they have a high gloss at first. There is no "bodying up" with them to give strength and substance, and they are particularly subject to blistering, flaking, *splitting, etc.*

HANGING MEDICINE CUPBOARD.—In the example shown in Plate V and Fig. 5, the bottom is lap-dovetailed to the sides, and the shelf is housed into them. Plain housing is all that is necessary here. The back is a single piece of three-ply, faced with oak or mahogany to suit the wood used for the job. The door, being small, may be of either solid stuff, $\frac{5}{8}$ in. thick, or of laminated board, but in either case it must be cleated round as shown in the section, the cleats being mitred at the corners (see Fig. 12).

The job illustrated has the quartered door front veneered in oak, with a centre circle and cross of contrasting veneers inlaid. This can be done by veneering the door all over first, and after the portion to be inlaid has been built up separately

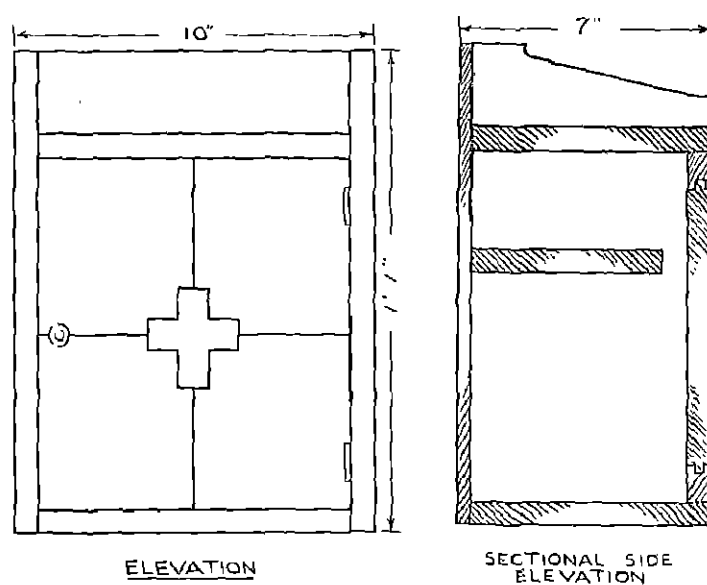


FIG. 5. HANGING MEDICINE CUPBOARD

All carcase work throughout the following diagrams is of $\frac{5}{8}$ in. stuff except where otherwise dimensioned.

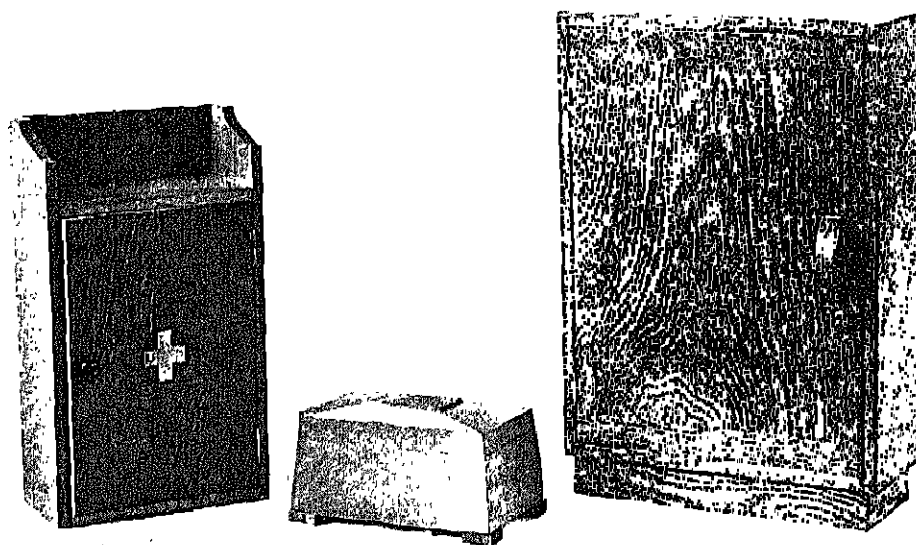


PLATE V. HANGING MEDICINE CUPBOARD, CASKET, AND STANDING MEDICINE CUPBOARD

on a piece of stout paper, laying it in position on the veneered door and scribing round it carefully with a knife point. The veneer is then cut through along this line by using a knife or sharp scribing gouges, and the centre waste is lifted out after being loosened by heating with a piece of hot iron as described in the chapter on "Decorative Processes." The inlay is then glued into place with a hammer. If it is an awkward shape, or appears to be going to give trouble to lay flat, a piece of cartridge paper should be laid over the whole door face and a caul used to hold down the inlay until dry, pressure being applied to the caul with handscrews.

A small shelf is useful in these medicine cabinets, and if the job has not been made to hold specific articles—in which case the shelf can also be housed in—it is best to make it movable by boring two columns of shallow holes up each side and using small pegs which can be obtained as for bookshelves, or can be cut from brass rod. With these it is best to have a glass shelf.

STANDING MEDICINE CUPBOARD.—In this cupboard (Plate V and Fig. 6) both the carcass top and bottom are secret lap-dovetailed to the sides and are cleaned off flush with them. This makes a neat finish although a narrow line of end grain shows along each edge. If it is desired to avoid this, the top and bottom can be stepped back $\frac{1}{8}$ in. as usual in this joint, and the corresponding $\frac{1}{8}$ in. be cut as a rebate along the front edges.

The door is solid stuff with the grain running vertically. It is cleated like a drawing board across the top and bottom to hold it flat and give a side grain finish to the top edge.

The joint shown at the front corners of the plinth base is not strictly necessary, but will

make a useful additional exercise. It is not difficult to make providing that all the parallel lines of cuts are gauged from the front faces after the ends are truly squared. The mitres on this and similar joints may be either cut with a chisel or planed with a block (shoulder) plane. This joint should not be forced up too tightly with handscrews when gluing, otherwise the tongue may be sheared off; in fact, handscrewing should not be necessary at all if the joint fits properly. Where mitre joints without tongues or dovetails are used, they are difficult to pull up in gluing unless triangular blocks of softwood are first glued on the outer faces of the members themselves. The handscrew can then be applied to

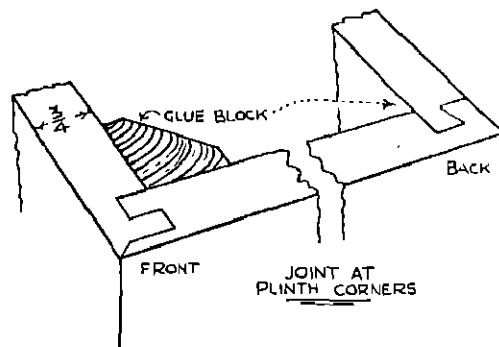
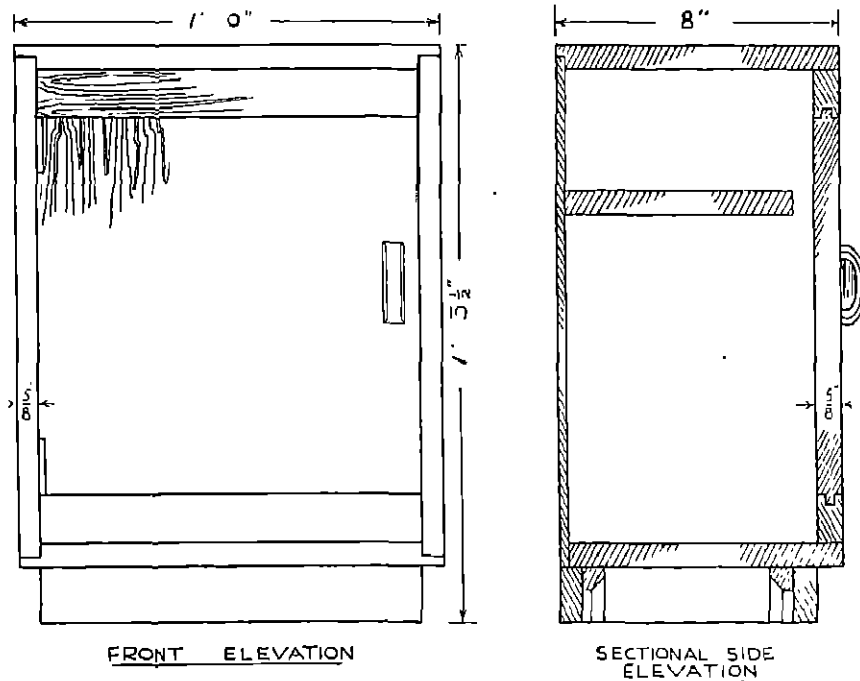


FIG. 6. STANDING MEDICINE CUPBOARD

these to give the pressure directly across the mitre faces, the blocks being cleaned off afterwards.

The rear joints on the plinth are those customarily used on larger jobs, such as bookcase plinths, and are dovetail housings. The inside corners are finally strengthened by vertical glue blocks, as indicated on the sketch.

Plinths may be attached to the carcase by slant screwing from the inside faces up into the carcase bottom, the clearance holes in the plinth being well countersunk, or they may be screwed down direct through the bottom—when they are stepped in as shown here—or they may be buttoned on in the usual way. If none of these methods is suitable, two cross rails may be dovetailed into the top edges of the plinth, the screws being put through these into the carcase bottom, as shown in the footings of some of the other jobs illustrated later.

SMALL TABLE.—The table (Plate VI and Fig. 7) is framed up with or without a drawer, as desired. The diagram shows the haunched double tenon to be used on the rails.

The top is best made of laminated board, mitre-cleated round the edges and securely buttoned on to come flush with the outside faces of legs and rails. It must be very carefully fitted, the top edges of the rails and ends of legs being cleaned off accurately so that it will "sit down" properly upon them all round.

The thickness (bare) of some selected saw-cut veneer such as American or French walnut,

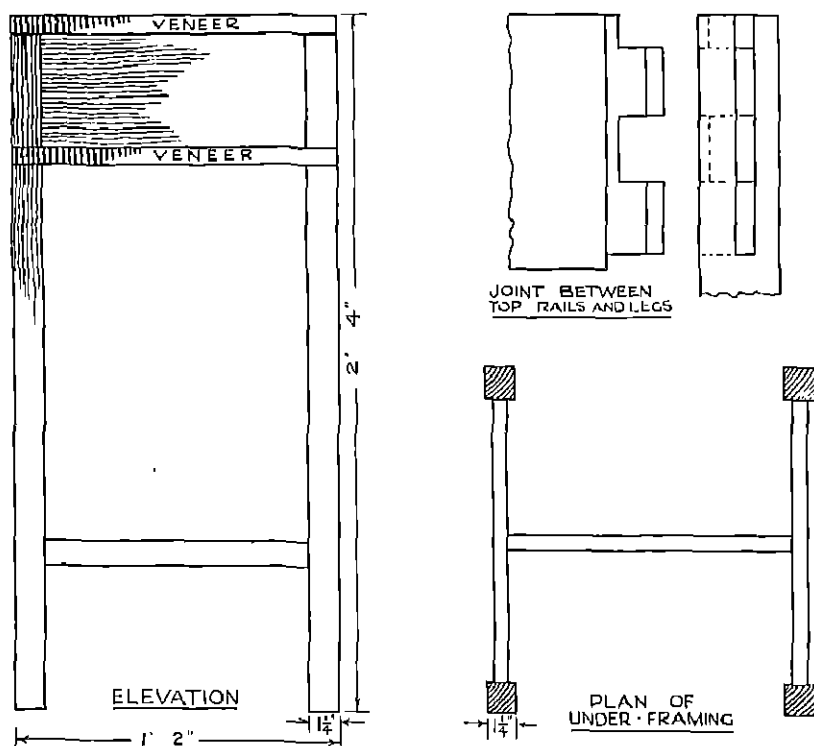


FIG. 7. SMALL TABLE

or Macassar ebony, being taken as the gauge for depth, the edge of the top is stepped back by that amount, a corresponding shallow band or groove being cut along the bottom edge of the rails and across the legs. The top can be done with the plane, but the lower inlay must be done as far as possible with the cutting gauge, then with the knife, and cleaned out with the router. This is a tricky exercise as, should the groove be taken even a fraction too deep, the job will be spoiled unless all the outside surfaces are cleaned down afresh to the correct level.

When ready, the crossbandings are laid with the hammer in the usual way, a piece at a time, and then the top of the table is laid with a plain or figured veneer, or quartered as required. Knife-cut veneer is used for the top, but saw-cut for the inlay crossbandings.

The table may be made in this way in oak, mahogany or walnut, with either harmonising or contrasting veneers.

MIRROR FRAME AND STAND.—This type of design (Plate VII and Fig. 8) is intended to be made in light oak or natural-finish walnut. See page 384.

The long-and-short shoulder mortise and tenon joint is used for the frame and provides the rebate to hold the mirror plate. This is sprigged in if necessary, but the frame may be thickened so that the back face is flush with the mirror, the job

being finished off with a piece of three-ply over the back, brought to within $\frac{1}{8}$ in. of the edges all round and rounded at the edges. This holds the mirror securely and is screwed to the back of the frame with roundheaded small brass screws, thus making a neat finish.

The joints in the stand are shown in the diagram, and the only decoration necessary is provided by the chamfers.

With a wooden mirror frame of this type, the neatest means of swinging it is the small, plated circular drum fitting, having a wedge-shaped lug on one half and a V-slot in the other. The mirror has the two lug halves, which enable it to be dropped into place between the two standards, the whole fitting being neatly screwed on to these and the edges of the frame. It is advisable to purchase the fitting before making the standards and frame, so that the width of the former and the clearance between them and the frame can be determined before the job is made.

Many variations are possible in the shaping of the feet and mirror frame, and their treatment by chamfers, etc., thus making this a valuable and useful job for inclusion in the scheme.

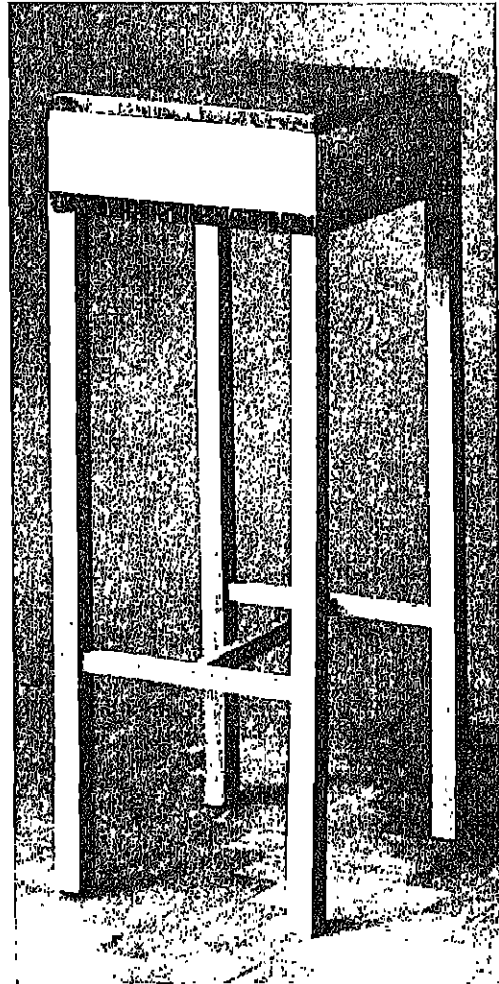


PLATE VI. SMALL TABLE

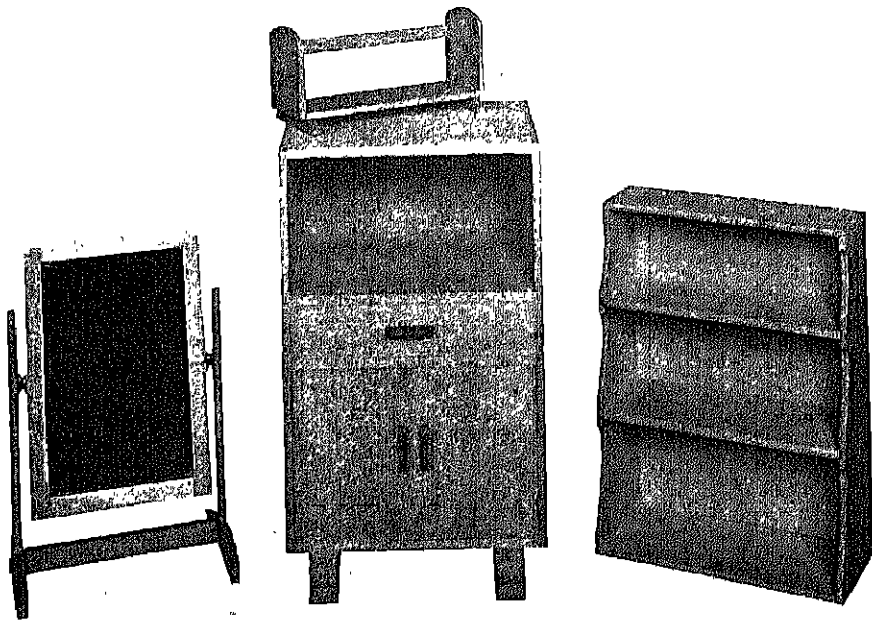


PLATE VII. MIRROR FRAME AND STAND, BOOK RACK, BEDSIDE TABLE, AND BOOKSHELVES

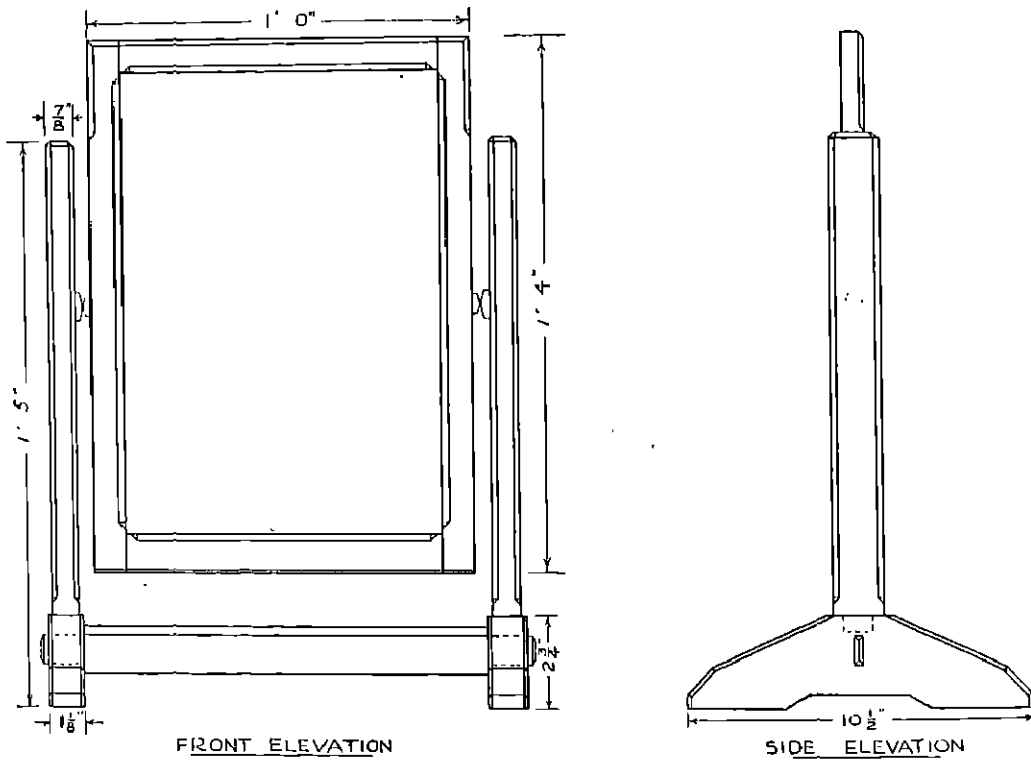


FIG. 8. MIRROR FRAME AND STAND

SMALL CABINET.—This medicine cabinet (Plate VIII and Fig. 9) resembles the one already given and may be varied in size and detail to suit its particular use.

Constructional details are the same, but should the design be made larger, a framed-up and panelled back should replace the three-ply one used on the smaller jobs and shown here.

This particular example is introduced because it illustrates the next step in the veneering

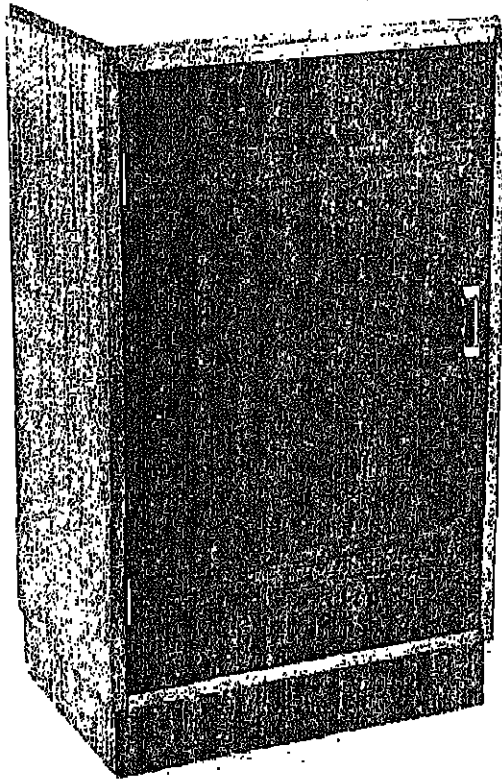


PLATE VIII. SMALL CABINET

process, the cross pieces (not cut across the grain as in crossbanding) being worked and laid on the door at the same time that the whole face is veneered.

The door veneer is laid with the hammer in one piece and then, whilst still damp, the bands are cut out about $\frac{1}{8}$ in. wider than their final width, from another veneer, with the straightedge and knife. They are lightly glued and laid in position on the door veneer. The straightedge is placed in position to marks made on the door edges beforehand, and both bands and door veneer are cut through together. The waste edges are peeled away from the bands, and these are lifted for half their length to allow the waste from the door veneer underneath to be peeled away. Lightly hammering down that half, the other end is lifted,

and the remaining waste from underneath removed. The whole length is then laid finally with the veneer hammer. The method for this and similar examples is really the same as that described for quartering in an earlier chapter, and it should be remembered that this method is much easier—with a little practice—and far more accurate than would be any attempt to inlay such detail by first cutting it to finished size, then scribing along it, then taking out the waste to scribed lines and endeavouring to fit the detail in.

Curved lines may be laid accurately by the same means, cutting through both thicknesses at once and removing the waste from each.

The plinth is veneered also, the veneer being laid as a crossbanding along the front and both ends. The plinth should first be cleaned up and finally fitted

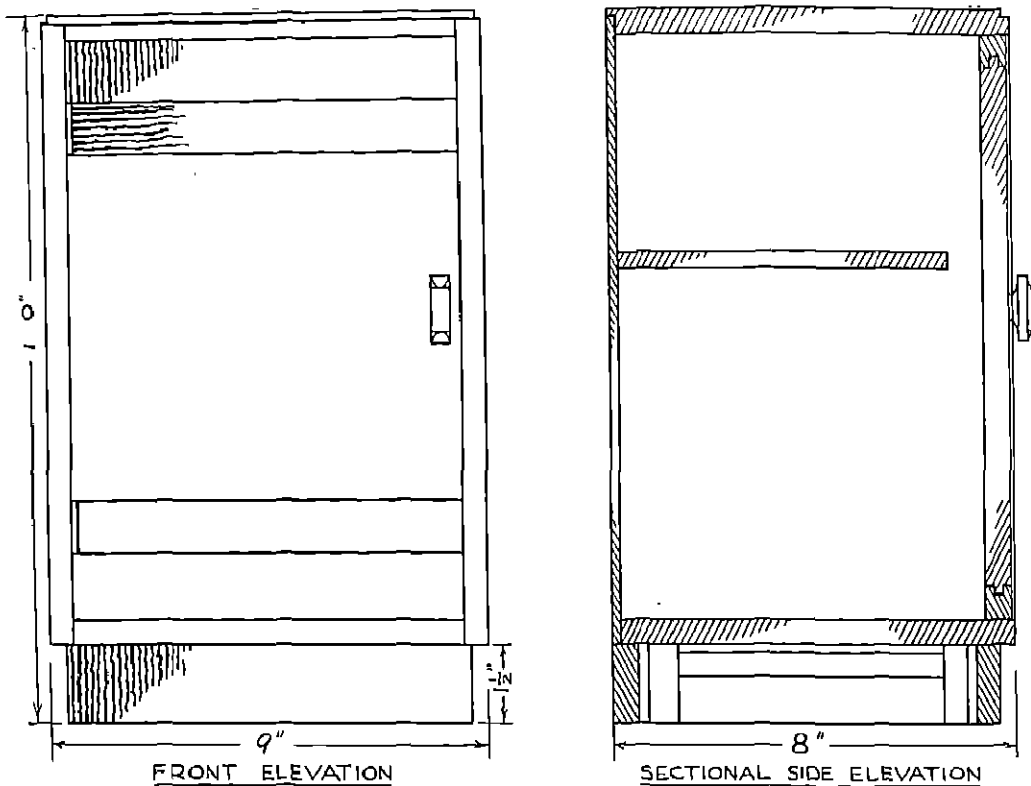


FIG. 9. CABINET IN MAHOGANY, WITH VENEERED DOOR AND PLINTH

to the carcass. It should next be removed, the veneering done and the edges trimmed clean, after which it should be put aside to dry. Then it should be replaced finally on the carcass.

BOOK TABLE.—This job (Plate IX and Fig. 10) is carried out in unstained mahogany, only the two side panels being veneered with white sycamore. The mahogany is lightly oiled with linseed oil, which gives it a slightly darker colour than natural and one which is interesting when placed in conjunction with sycamore.

The front panel at the curved end is tenoned right through the top and bottom, and wedged. This treatment looks decorative and not merely clumsy. It is necessitated by the

practice of lifting bookshelves by the top alone, a habit which tends to pull housings apart. The rear panel is lap-dovetailed into top and bottom. The shelf is housed into the rear panel but double-tenoned into the front one, the tenons alternating with those of the semi-circular shelf which continues the line of the main one.

The two veneered side panels fit under the top but are let in flush with the edges of shelf

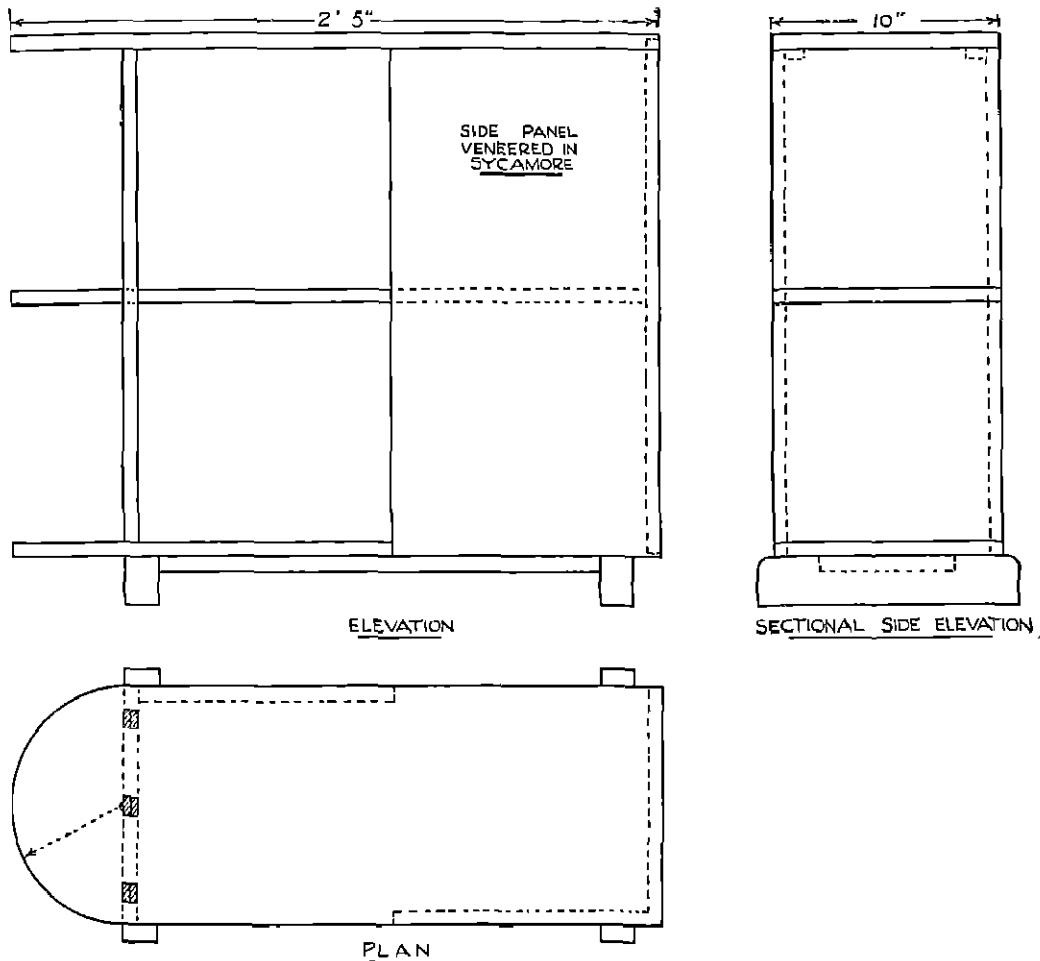


FIG. 10. BOOK TABLE IN MAHOGANY AND SYCAMORE, UNSAINED

and bottom. Two narrow fillets are screwed to the underside of the top, one behind each side panel, and both panels are dowelled to these fillets, to the shelf, and to the bottom.

The footings are joined by a centre rail which is dovetailed to them and screwed to the bottom of the bookshelves.

The table is finished with wax polish.

Many designs for tables of this type are possible, all carried out in full $\frac{1}{2}$ in. stuff, and giving valuable training in planning unusual and individual constructions with a great variety

of decorative treatments. At the same time they should be designed for reasonable use, and not merely to look "modern" by being composed of holes and corners, bits and pieces, and at all angles, irrespective of either use or sound construction.

NEST OF DRAWERS.—Being small and compact, this job (Plate X and Fig. 11) makes a pleasing accessory for the individual who is lucky enough to have a writing table of fair size on which it can stand. It is intended to hold stationery oddments in addition to paper, envelopes, etc., to take the place of a cabinet specially made for this purpose.

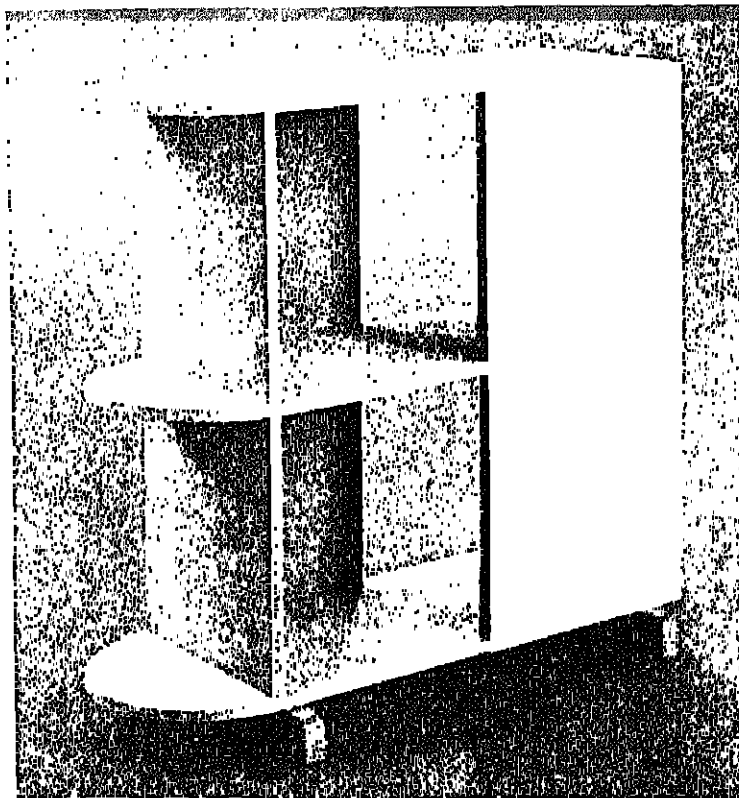


PLATE IX. BOOK TABLE

The carcase is secret lap-dovetailed to leave a $\frac{1}{4}$ in. rebate along the edges. This rebate is continued along the remaining edges, as shown, to take the bead moulding of quarter-circle section which is "planted" (glued) into it. This moulding is best mitred between the two horizontal lengths at each corner, the mitre being arranged to come at the crown of a bead. The vertical lengths should then be fitted in between, thus butting up against the horizontal sections.

Before this is done and before the carcase is glued up, the ends and top are worked to the decorative finish shown. The surface of each is sunk to a depth of $\frac{1}{16}$ in. to leave the octagonal centre portion standing. This is done by working carefully to a fine gauge line round the edge of the piece, with a cut line marking the outline of the octagon. The waste is cleared with a block plane. The extreme edges only of the octagonal portion are then

very slightly rounded with fine glasspaper, the surface of the ground being protected from scratches across the grain (which will show badly when polish is applied) by being covered first with a piece of paper.

This work, of course, follows the jointing of the carcase.

The rebate for the three-ply back is cut and the job is then glued up.

The drawers are made in the usual manner except that the fronts are made $\frac{1}{8}$ in. too big over-all. The $\frac{1}{10}$ in. overhang at each end is allowed for by lap-dovetailing in the sides that much too far, leaving it projecting. The $\frac{3}{10}$ in. thickness of the projection is then carried right round the drawer front by rebating the top and bottom edges to match.

Before gluing up the drawers, the fronts are slightly fielded as shown in the drawing, leaving about $\frac{3}{32}$ in. sq. on each edge. The drawers are then glued up very lightly, so that no great amount of cleaning has to be done on the sides afterwards. Therefore, as the fitting

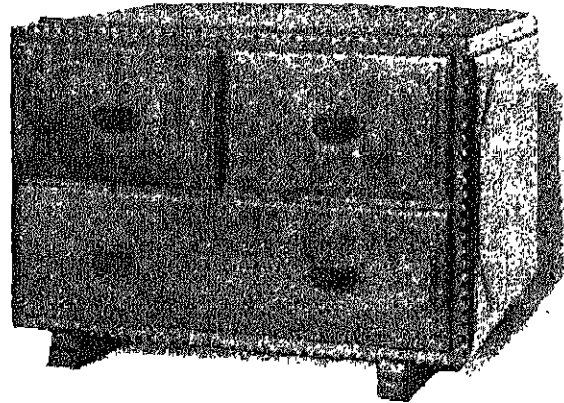
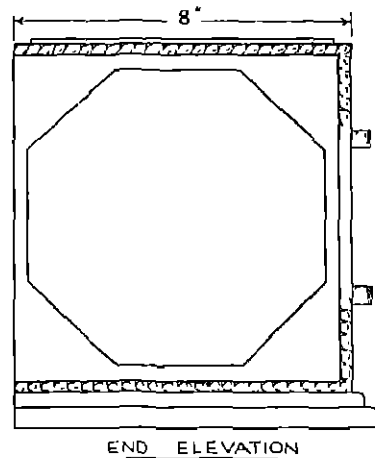
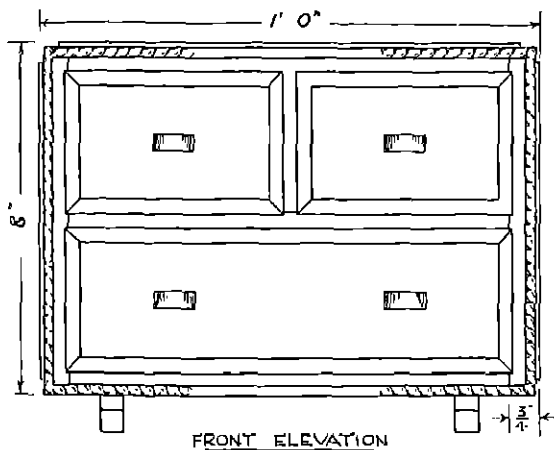


PLATE X. NEST OF DRAWERS



HALF-PLAN

FIG. 11. NEST OF DRAWERS

cannot be done with the ordinary smoothing plane, it has to be done with a bull-nose plane, so that the less there remains to be done after gluing up the better. It is also essential that the drawers are glued up square; cramps need not be used.

To finish the job properly and to make it more attractive, the small wood pulls should be tenoned through the drawer fronts and cleaned off flush with the inner surface.

If a contrasting dark or light wood is used for these, the same may be used for the two light footings. These should be countersunk and screwed on to the bottom with brass screws, a strip of baize afterwards being glued along the under face of each footing to cover the screw heads and to prevent any scratching of the surface on which the drawers are to stand.

The job—because of the particular details of its style—is best made in oak, stained down to “mid” tone; or in walnut, in which case the rebate on the edges should be reduced in depth and left without any planted moulding whatever.

HANGING CABINET.—This more elaborate job shown in the illustration (Plate XI and Fig. 12) depicts a cabinet carried out in mahogany with satinwood line round the edges of doors and drawer fronts. Two small drawers are introduced and the back is framed up and panelled.

The three shelves, being very narrow, are plain-housed into the sides. The strong back is rebated and screwed to the sides in the usual manner (shown in the section on constructional units of carcasses) and this, combined with the narrowness of the shelves and the lightness of the job, makes it unnecessary to use dovetail housings for any of the shelves. The housing joint in which either the whole length or a few inches from the front edge of a shelf is dovetailed, is a most difficult joint for a lad to make. It is entirely hidden, as regards fitting, and is almost impossible as to marking out, so that it is largely a matter of skill and experience in the actual working. A well fitting plain housing is far better than a badly fitting dovetail housing, as the whole purpose of the introduction of the latter is to pull up tightly and hold up the shoulder between shelf and side, to enable it to stand the strain of movement of the carcass, or of drawer fitting. For this reason the joint is used mainly on fairly heavy carcasses of some width and depth, but there again it is useless unless it taps up to a close fit.

The doors are of laminated board, mitre-cleated as shown in the detail diagram. This board is recommended throughout the scheme for doors and table tops as it will keep flat. As it is faced as a rule with gaboony mahogany, it makes a suitable ground upon which to veneer. The extra trouble involved in making the grooved cleats and in cutting the tongues for them on the edges of the board is well worth while as it obviates the danger of shrinkage and warping that almost certainly will follow the use of solid stuff for these details. The cleating provides a side-grain finish all round the edges, covering the raw and end-grain edge of the board and allowing the door to be properly and securely hinged. If solid stuff should be used, it would have to be cleated across the grain at top and bottom, and mitring of these cleats would have to be carried out at each corner to make a neat job—a joint which is far from easy to accomplish. Even then, as doors on most of these jobs are only $\frac{5}{8}$ in. in thickness, there is no guarantee that warping will not occur, even though both top and bottom edges are held in straight line by the cleats, so that after a few weeks have elapsed, or a sudden change has occurred in the weather, one corner of the door projects beyond the carcass front for perhaps $\frac{1}{4}$ in. and the whole appearance of the job is spoiled. When this occurs, nothing short of making an entirely new door can be done to remedy it, and for this reason it is strongly advised that the laminated board be used when the door is not to be framed-up and panelled. In any case it is advisable to veneer the door on both sides, as drying veneer exerts a very strong pull—especially one such as American black walnut—

and may cause casting or hollowing on that side, unless counteracted by an equal pull on the opposite side.

Should laminated board be unobtainable, the only safe method to adopt is to frame-up the door with mortise and tenon joints, plough the grooves along the inside edges for a panel and haunch the tenons, and fit a thicker panel—say $\frac{1}{8}$ in. stuff—rebated round the edges to fit in the framing flush with the outside faces or face sides, and fitting exactly to the inner edges of stiles and rails. This flush-surfaced door may then be veneered safely on the outside face, and should keep flat.

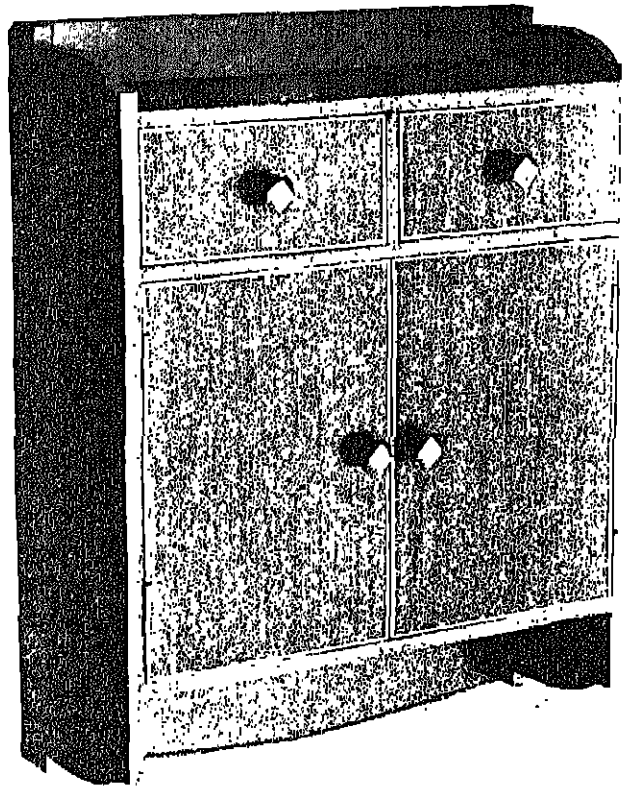


PLATE XI. HANGING CABINET

In the example illustrated, both doors and drawer fronts are veneered in mahogany, the grain running vertically down each front. The edges are then gauged out with the cutting gauge and a satinwood line, $\frac{1}{8}$ in. square, is run in to finish off.

Suitable Bakelite pulls may be obtained for a job of this type, or the small, circular, black "shutter knobs" with or without a white spot in the centre may be used. Wood pulls of the type used on oak and some walnut jobs would be out-of-place with mahogany and satinwood and would look too heavy and clumsy for the material though not for the size of the

job. If the design and material are right, wood pulls may look pleasing on even the smallest jobs, but they do not harmonise with either mahogany or satinwood, possibly because these two woods are ineradicably associated in the mind with delicacy of design and fragility of construction, as in the Hepplewhite style.

When doors and drawers are fitted to a carcass, stops should be put in to ensure alignment of the fronts when closed and to prevent the drawers from hanging up against the carcass back. Sometimes the doors and drawer fronts are intended to lie flush with the

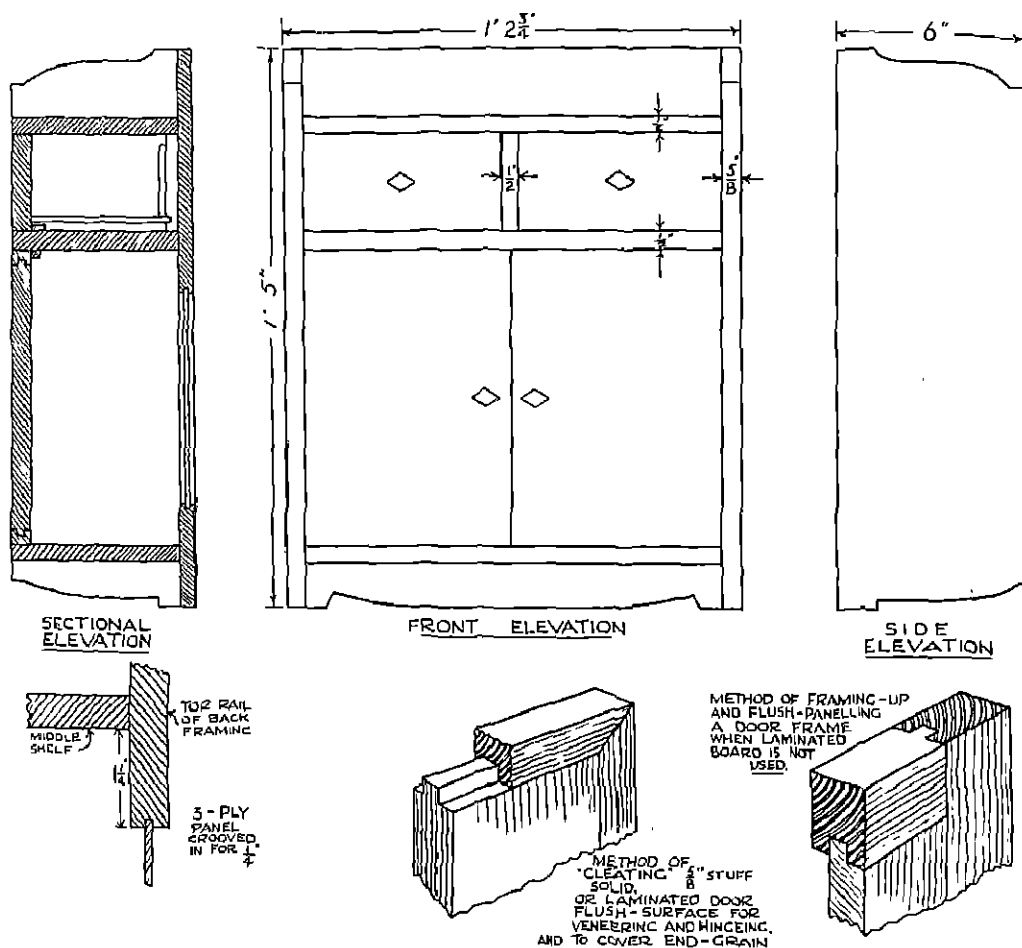


FIG. 12. HANGING CABINET

front edges of the carcass, but more commonly they are set in for about $\frac{3}{82}$ in., as the small shadow line thrown by the edges in this way helps to emphasise the construction lines and to break up the flatness of the front view. The drawer stops are small rectangular blocks of wood glued on to the shelf or drawer rail in such a position that when the drawer front is stopped by them the front surface is set in by just the right amount, and the drawer back is clear of the carcass back. The doors are best stopped by a narrow fillet glued underneath the shelf above and running from side to side of the carcass, at such a distance from the front edge that the doors when closed will be set in the same amount as the drawers. To

prevent them from swinging open, a ball catch engaging with a socket can be fitted into the top edge of the door, the metal plate of the socket being on the underside of the shelf above, and thus out of sight. But a ball catch should never be relied upon to disguise a badly hinged door which swings out for some distance as soon as released. If this happens, the door is what is known as "hinge bound"; i.e., the hinge flap has been let in too far, so that when closed, the door is riding on its inner edge against the carcass side, and the leverage exerted via this edge upon the hinge flap when the other edge of the door is pushed to is very considerable and may wrench the screws from the carcass side. In any case the door refuses to stay shut when released, and the only cure is to pack a strip of stout paper or a shaving under the hinge flap until the door can be closed easily. It should be remembered too that the whole thickness of the knuckle of the hinge should be let into the door at the front edge, the outer flap then being splayed at a slight angle into the carcass side (the exact front edge of the latter being untouched) to give clearance when the door is closed.

Boys, and many others, are notoriously careless about correct hingeing of doors. A pair of hinges should be fitted to two practice pieces of stuff before any attempt is made to swing a cabinet door. In any case, a specimen example of such hingeing should always be available in the workshop for observation and explanation.

SMALL CABINET FOR REFERENCE BOOKS AND STATIONERY.—This is a useful exercise (Plate XII and Fig. 13) and is an adaptation on a larger scale of a job which has been popular for a number of years. By slightly increasing the size of the cabinet, it can be used to accommodate the smaller reference books always needed, along with station-

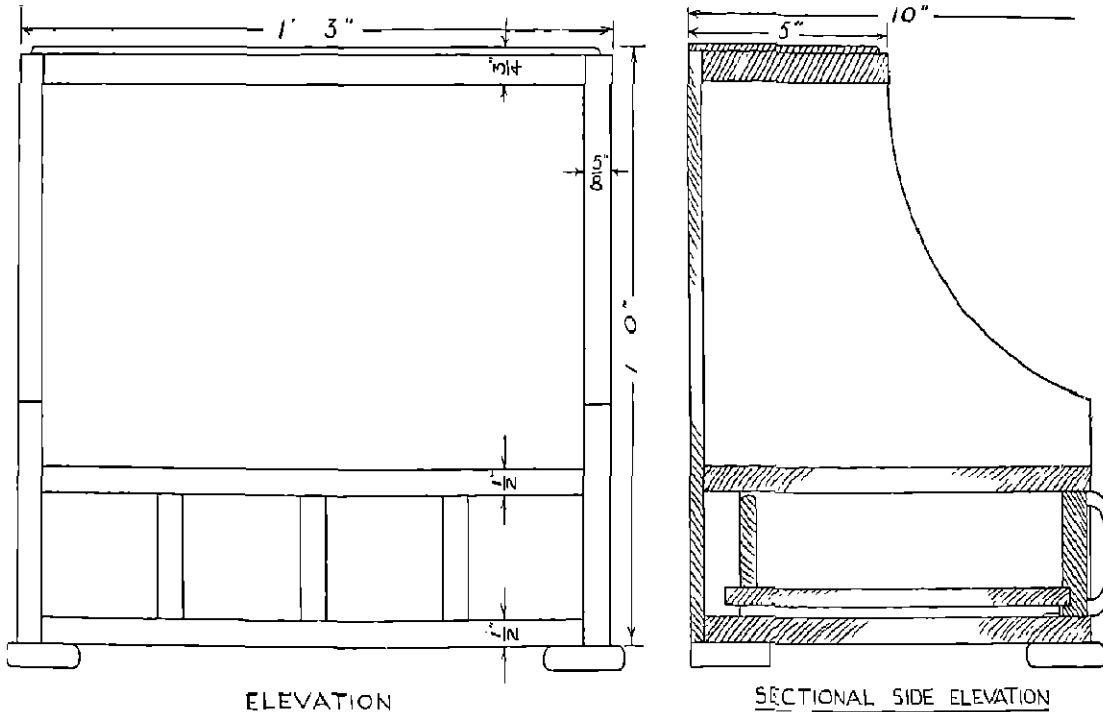


FIG. 13. SMALL CABINET FOR REFERENCE BOOKS AND STATIONERY

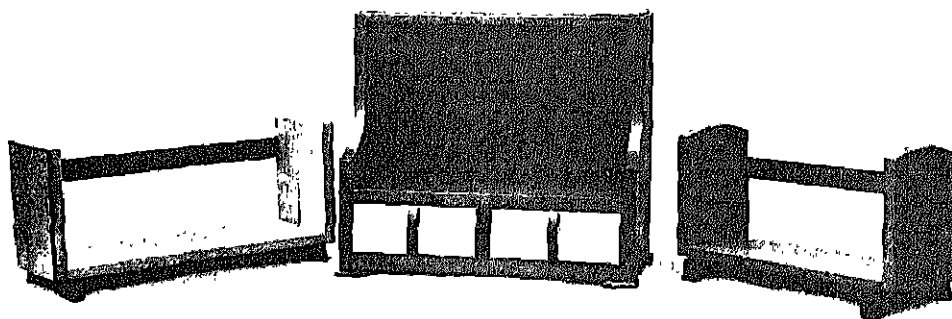


PLATE XII. SMALL CABINET

ery, in a handy position for the writing table, and in common with the cabinet shown in the next diagram it makes a pleasing addition to the furniture in a room.

There is nothing in the construction that has not already been covered in the previous descriptions and diagrams. The job is made in walnut, and the drawer fronts are veneered with maple, sycamore, figured French walnut, or Macassar ebony, as desired.

STATIONERY CABINET.—Made in light oak or oiled walnut, this small cabinet (Plate XIII and Fig. 14) is an alternative design to the one shown in Fig. 12.

Constructional details are covered by previous descriptions.

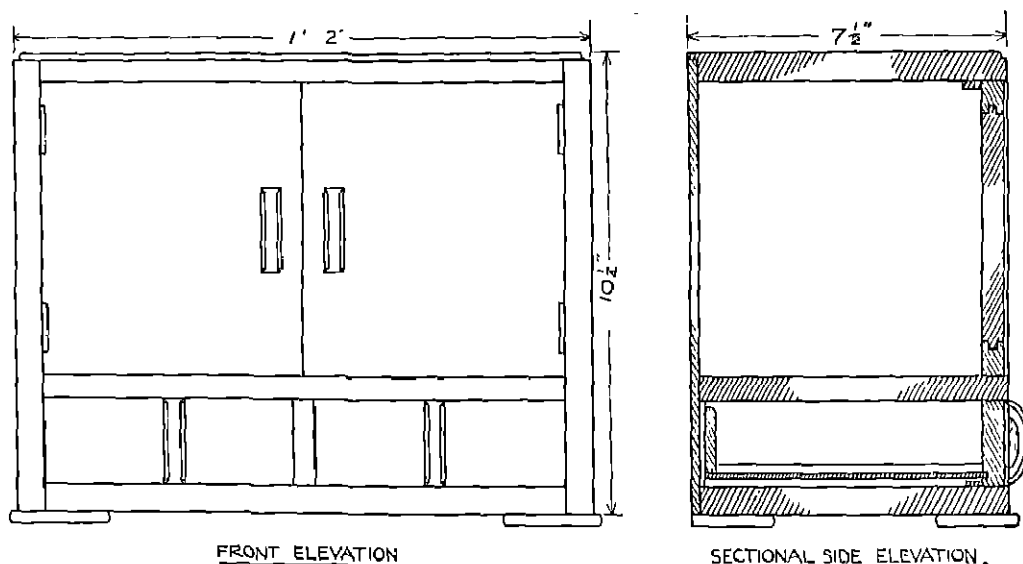


FIG. 14. STATIONERY CABINET IN OAK OR WALNUT AND MACASSAR EBONY

CARCASE TOP, secret lap-dovetailed to sides.

CARCASE BOTTOM, plain top-dovetailed to sides.

DOORS, mitre-cleated, solid.

DOORS AND DRAWER FRONTS, veneered with Macassar ebony, plain all over.

PULLS, American walnut.

The veneer used is Macassar ebony, which contrasts well with either light oak or walnut, and the pulls are shaped from solid walnut. These, it will be noticed, are placed vertically across the drawer fronts, and the same arrangement is maintained through practically the whole of the suggestions given for this scheme. The reason for this particular placing is the fact that they then conform directly to the lines of the main construction, and link up the lines of the shelf and carcase bottom. On work of this type they are frequently placed horizontally, but if the job is small, as in this case, they then appear to be rather too heavy

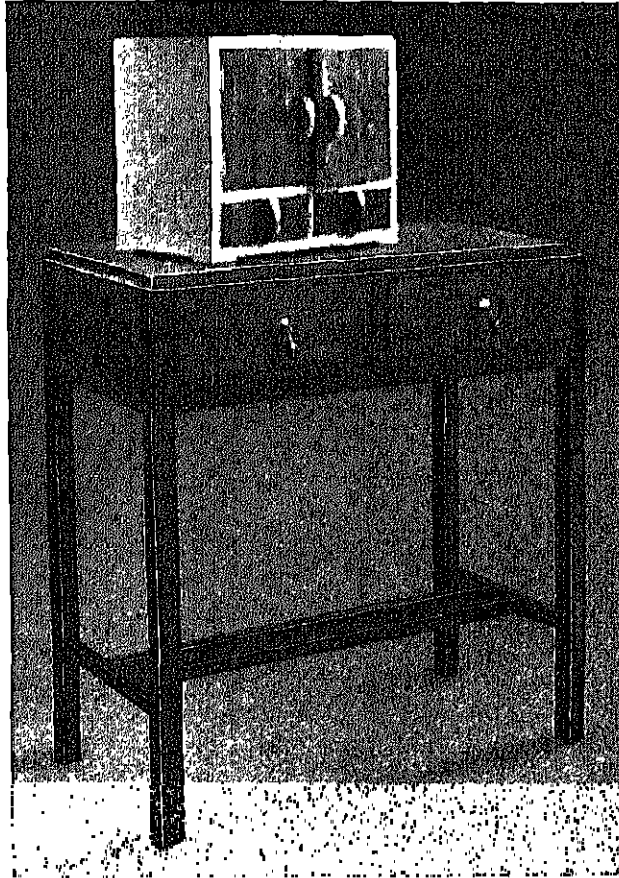


PLATE XIII. STATIONERY CABINET AND OCCASIONAL TABLE

and to be isolated pieces stuck rather clumsily on to the front of the drawers. If it is not desired to place them as shown, it is suggested that skutter knobs or other ready-made small pulls would be more suitable. The use of wooden pulls is entirely a matter of taste and the writer does not wish to imply that they are essential, although it is suggested that they are much more in keeping with the style of work dealt with than are many of the average "fancy" pulls sold by stores.

SMALL CABINET.—This cabinet (Plate XIV and Fig. 15) differs in two small features from the other examples in the earlier diagrams. The door is set in to the lines of the decoration; the footings are cross-halved to give an equal projection all round.

The carcass is made first with the usual secret lap dovetails at the top, the latter being advanced for $\frac{1}{8}$ in. of its thickness to come flush with the carcass sides. The bottom is plain lap-dovetailed into them.

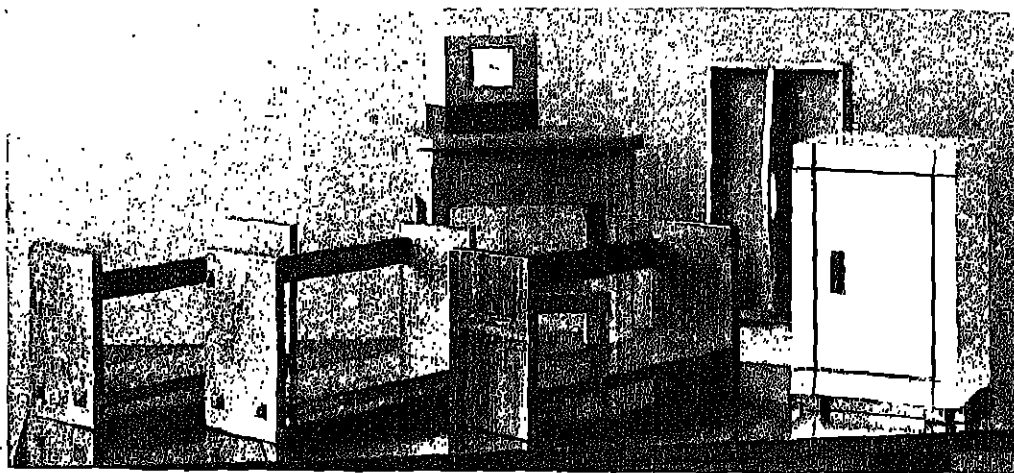


PLATE XIV. BOOKRACK AND SMALL CABINET, CLOCK CASE IN SYCAMORE AND MACASSAR VENEER, STOOL IN OAK, AND DOVETAILED KNIFE BOX

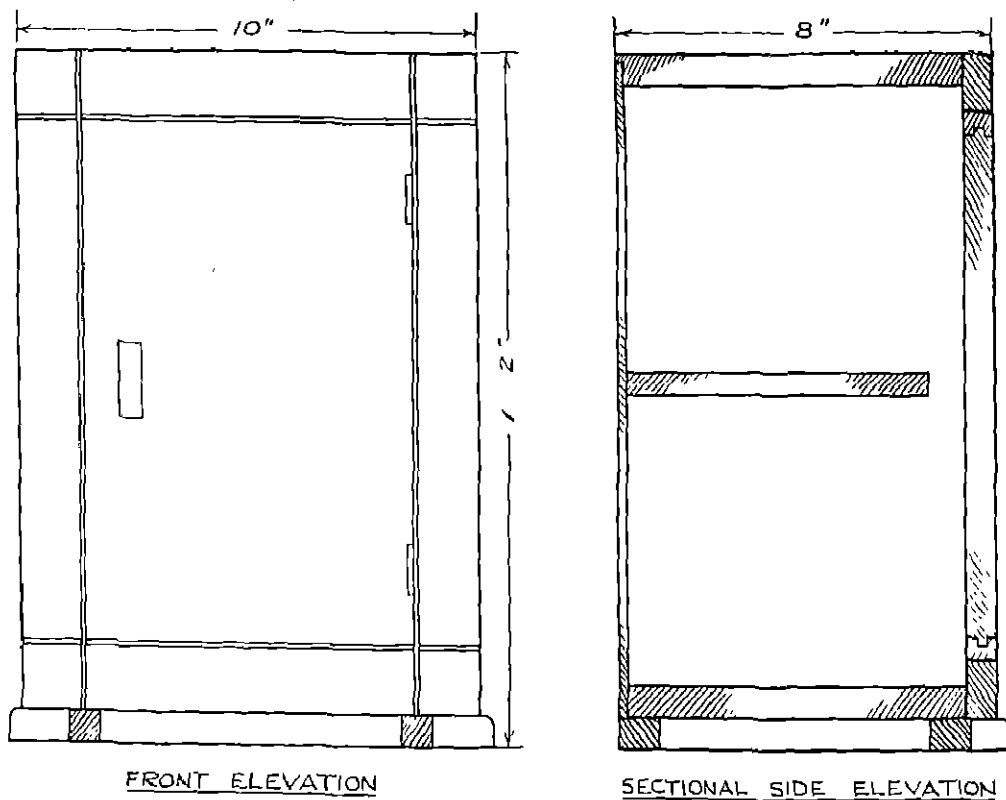


FIG. 15. SMALL CABINET

A flat frame is then made of $\frac{3}{8}$ in. stuff, and the corners mitred. This frame is glued and pinned to the front edges of the carcass after careful fitting.

A solid door of the same thickness, cleated, is then made and fitted to the opening. Shelf and back are fitted as usual.

The fronts of the flat frame and the door are now veneered, plain, or the frame may be crossbanded, avoiding mitres at the corners by carrying the veneering of the stiles right up through.

The inner edges of the frame are then finished with a contrasting line, which is carried on as an inlay across the frame corners. This can be done by continuing the gauge lines by means of a straightedge and sharp knife to cut through the veneer, and carefully removing the waste with a $\frac{1}{16}$ in. chisel. From the cross-overs of the lines only $\frac{1}{16}$ in. thick line is used instead of $\frac{1}{8}$ in., as it would be impossible to cut a sufficiently deep groove for the latter with a knife. The thin line can be purchased from a dealer.

The door is left without a lined edge, and is hinged as shown.

The footings are cross-halved to give the appearance indicated, and may be made of solid walnut, or, if black line has been used instead of walnut line, they may be made of white-wood and be dyed black to match. Black on such a small job is rather a harsh contrast; the use of walnut gives a better appearance.

After a good scraping and glass papering of the surfaces, wax polish is all that is required for a finish.

SMALL CABINET.—This design (Plate XV and Fig. 16) is definitely intended to be carried out in oak and finished natural colour, or stained down not deeper than "brown oak."

Although it much resembles previous designs, there are two additions requiring a little more workmanship. The back is framed-up and panelled, and a stopped chamfer curving across the shoulder corners on the door is introduced.

The door is framed-up with the haunched mortise and tenon joint; the panel fitted, and then all excepting the extreme ends of the chamfer is cut with a wide chisel before gluing up. After the door has been glued up and cleaned, the corners are finished. This chamfering is a difficult exercise and needs to be done well, otherwise any inequalities show up very

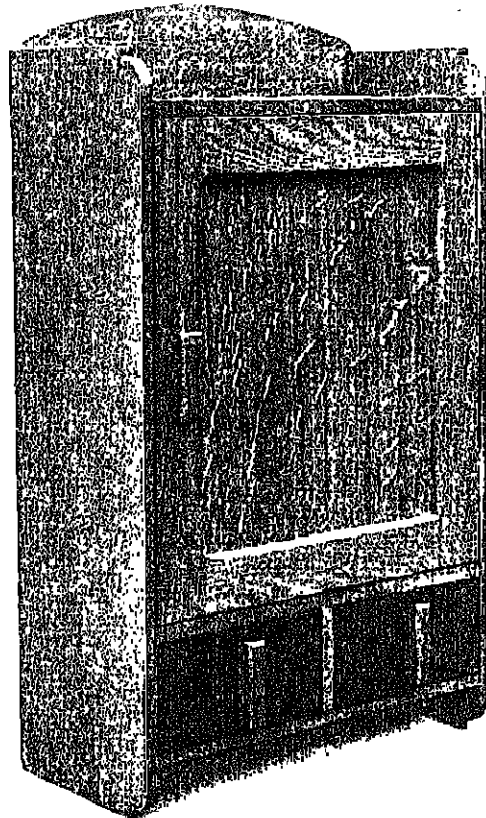


PLATE XV. SMALL CABINET

badly when the job is polished, although they may not be noticed before this is done. Some preliminary practice is desirable, using a piece of the same wood and a chisel not less than $\frac{3}{4}$ in. in width.

The back is made with the same joint, and screwed to the splayed rebate cut along the carcass sides. To avoid having to cut this as a stopped rebate (an unnecessary and tedious operation) it is carried right through to the top. The back framing itself is made to fit to just over half-way up the thickness of the top shelf, and then a separate rail is fitted and shaped to stand above it, as shown. This is done to avoid the shoulder line of the top joints of the frame being continued right through, and to enable this to be neatly fitted the part

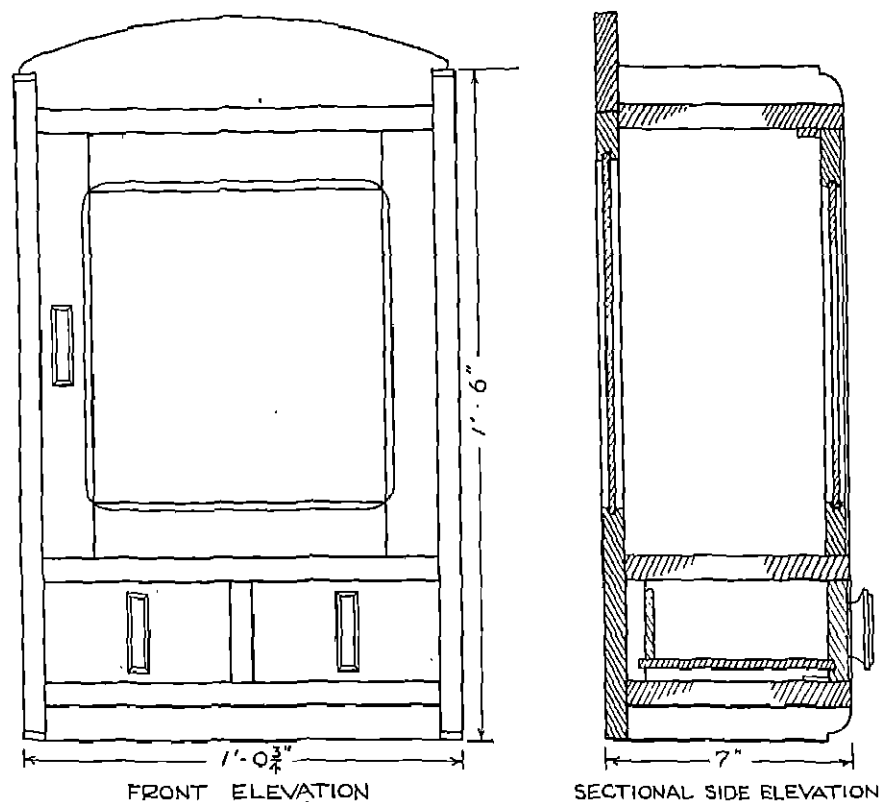


FIG. 16. SMALL CABINET

of the rebate occupied by it has the splay removed with the chisel, so that the ends of this top rail are square where they emerge from the carcass.

The partition between the drawers is stop-housed from the back into both shelf and bottom, the joint being stopped about $\frac{1}{2}$ in. from the front edge and the partition being notched at the corners to come forward flush with the same edges. The grain of this small partition should run vertically at the face in front, and it is customary, where the carcass is of any considerable depth from the back to front, to make the partition with the grain running that way and along its length, and to tongue and groove a strip on to it at the front only, as required. This strip, or small cleat, would be about $1\frac{1}{2}$ in. wide.

Other details are the same as previously described and the job is wax-polished.

BOOKSHELVES.—Although larger and more difficult to handle, the job (Fig. 17) is a straightforward one to make. The two top rails shown in section are lap-dovetailed to the sides, the outer top being screwed on through these rails.

The centre shelves are plain stop-housed from the back. The same joint is used for the bottom shelf, but this is considerably strengthened by adding a stretcher or tie-rail underneath it, as shown in the diagram. This rail is stub-tenoned, or housed also if sufficiently

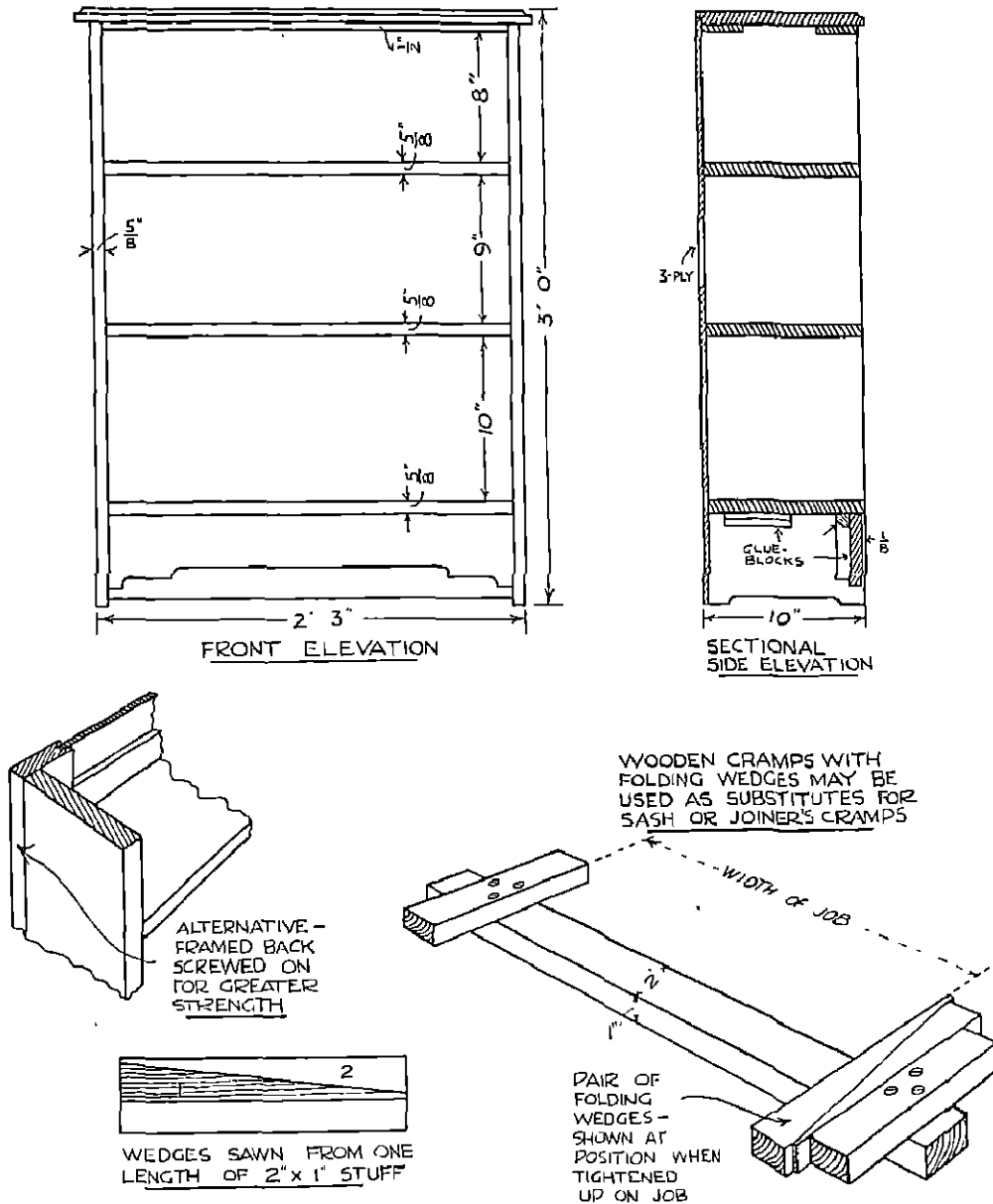


FIG. 17. BOOKSHELVES

wide, and reinforced by glue blocks fitted behind the corner and also between the shelf, sides and tie rail.

A three-ply back is used in this case but, should time be available for making a much stronger job, a framed-up and panelled back should be made having a wide bottom rail to give an equal margin above the bottom shelf with the stiles, and a rail behind each of the other shelves wide enough to give the same margin above and below them. To avoid what is, for a lad at this stage, a tedious and difficult job in working a splayed rebate to take this back right down the 3 ft. length of each side, and fitting it, the back may be made the full over-all width of the bookshelves and screwed directly on to the back, being cleaned off flush with the sides. This makes the shelves very strong and rigid. It prevents racking or springing of the housings when the shelves are moved about, and if the back is carefully fitted to the rear edges the join is hardly noticeable.

In gluing up larger work such as this speed is essential, with the provision of suitable sash, or joiner's cramps, to hold up the joints firmly until the glue is set and hard, and to keep the framework in square. All frames and carcasses so cramped should be tested for squareness on the face whilst lying in the cramps, as frequently the tightening up of these unevenly will pull a carcass a little out of square. This makes it almost impossible subsequently to fit doors and drawers accurately. This tendency can be rectified by adjustment of the cramps.

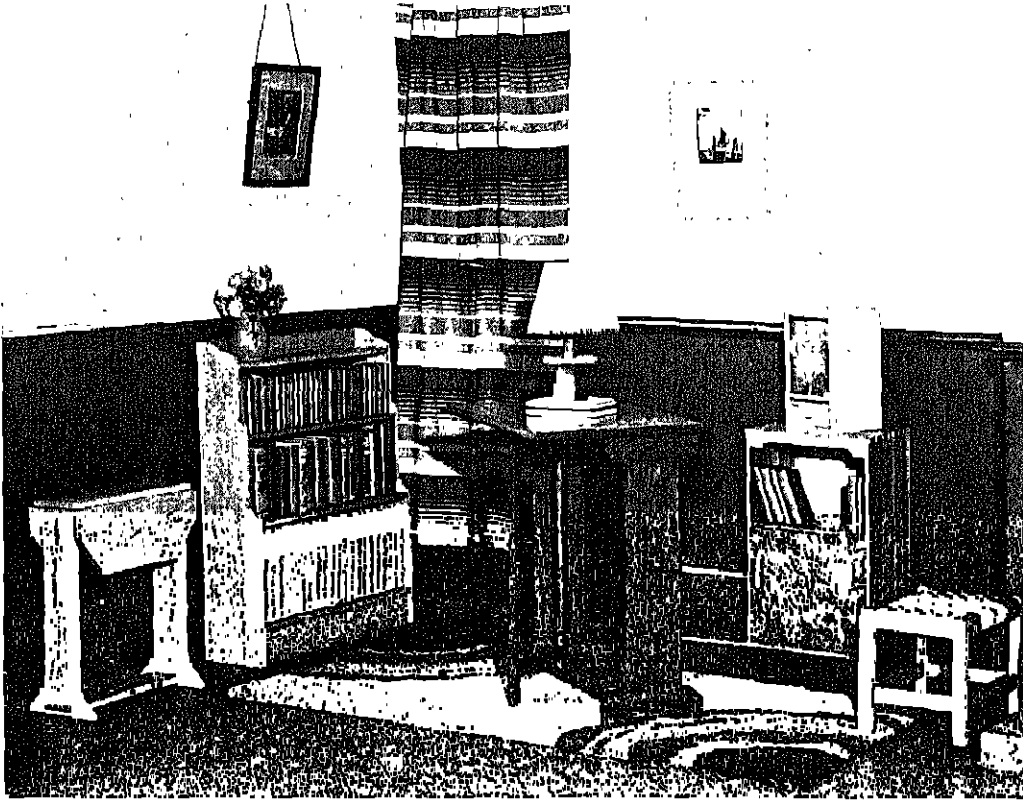
The large area of surface to be planed, scraped and cleaned true in a job of this type, combined with the difficulties of gluing up and cramping in a somewhat confined space, makes this a much more advanced job for a lad than would appear from the drawing or photograph. But one or two lads will be able to tackle it at about this period of the course, although it is not suggested that this is the type of work to be set, or allowed, for a group or a class.

In gluing up work of this kind the boys should be taught to keep cool and not get flustered; to see that everything is ready beforehand, such as cramps ready adjusted to slip on to the job, with plenty of blocks of wastewood to protect the surfaces; handscrews ready and adjusted in the same way; glue hot and conveniently placed with hot water and rag in case it is needed, and a mallet also to hand. All the individual members should be laid out ready to go together and each one should have been lettered or numbered clearly so that there may be no confusion as to which tenons, etc., belong to which mortises or housings. More jobs are spoiled by unreadiness or carelessness in these things than by lack of skill or knowledge.

If steel cramps are not available in sufficient numbers, effective substitutes may be made, as shown in the diagram.



THIRD YEAR: INDIVIDUAL AND GROUP WORK



PART OF A ROOM FURNISHED AND DECORATED BY THE CHILDREN OF A SENIOR SCHOOL

THE examples illustrated in this section are of larger work such as may be, and has been, carried out by the more advanced small groups, and by individual boys.

It is not intended to suggest that all third year work should be large. Much of the work should be on a small scale and of the type already mentioned in detail, but carried to a more advanced stage of design, decoration and finish. The size of the work is unimportant in comparison with these factors; further, it is undesirable that twenty boys in a normal school workshop should all be attempting large work at the same time on double benches. In fact, one may say that such a plan is impossible. If, however, the syllabus is restricted to small articles entirely, its scope will be much narrowed; also, there will be a certain number of able pupils desirous of making useful pieces of furniture on an essentially larger scale.

Connection with evening school activities.—In many instances such articles of furniture cannot be completed during the time available at day school, but will be finished—in the same workshop and under the guidance of the same teacher—during evening school sessions which are attended by the boys after leaving the day classes.

The evening school practical instruction classes are rapidly becoming an essential part of the senior school activities, and it is with this fact in mind that more advanced work may be attempted by certain pupils during their last year at school.

Other types of woodwork will still be carried on alternatively to this, right to the end of the third year, but these will be referred to in detail later. It should be borne in mind that the following pages deal only with the major portion of the syllabus.

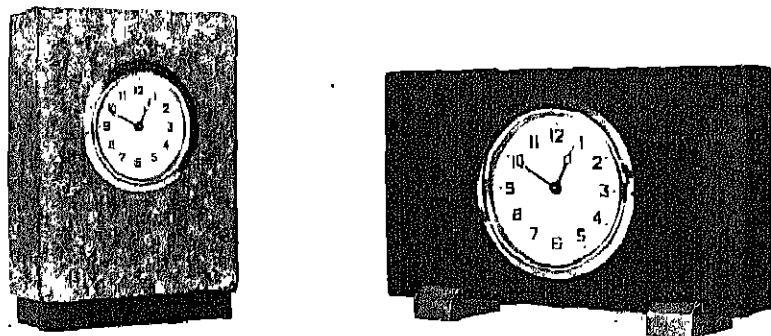


PLATE XVI. CLOCK CASE

CLOCK CASE.—The construction of such a case (Plate XVI and Fig. 18) as the one illustrated in the diagram is considerably more advanced than that of the example given under this heading in the second year work, although its appearance may be similar. There is not the same danger, however, of shrinkage of the wood causing end grain to protrude and crack the veneer, or to show through it.

Secret mitre dovetail joints are used at the top of the case, ordinary lap dovetail joints at the bottom. The mitre joint is illustrated in the section dealing with *Woodwork Joints*.

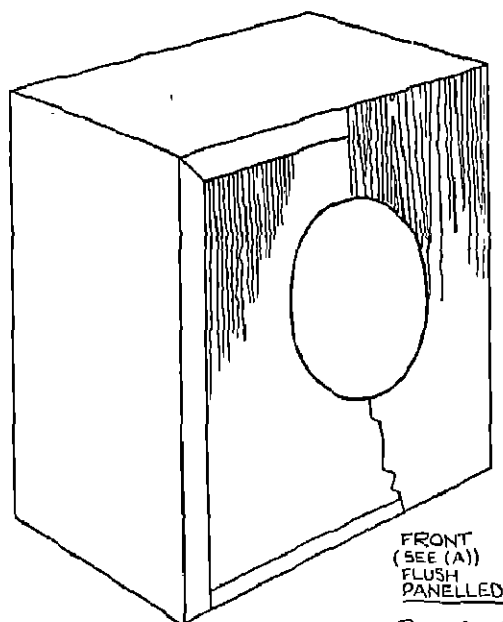
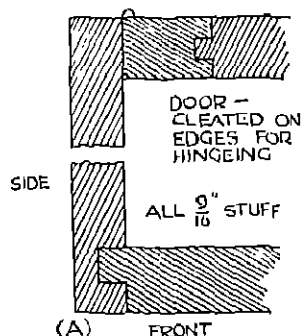


FIG. 18. CLOCK CASE



The front is flush-panelled as shown in the diagram, and a solid cleated door is fitted in the back.

Any veneering is done, as before, previous to the cutting of the circular hole to take the movement, the rim of the latter fitting over the edges of the hole. A small metal bracket should be made to support the movement inside.

Stuff of $\frac{9}{16}$ in. thickness should be used for this job, as it is very difficult for a boy to attempt these joints and obtain a good fit in anything of less thickness. The front will be too thick for the ordinary disc cutter or circular gauge to be used. The easiest means of removing the waste from the circular hole is to bore a hole at the circumference and then saw round the circle with a pad saw or a fretsaw, working, of course, from the front outside face.

These cases should be French-polished, or wax-polished.

CASKET.—Veneering of the splayed sides makes a mitred joint essential in this job, and two types are shown in the detailed diagrams, Fig. 19. (See page 404.)

In the first case, a plain mitre is shot on each piece to a cut line marked with the sliding bevel adjusted to the angle of the splay. The stuff being thin and the job very light, a strong joint is obtained by making an angled saw cut and gluing in some hardwood keys of saw-cut veneer. As it is no easy matter to hold together two splayed members on a mitre whilst doing this, a simple device is shown which can be made and kept for future use. It consists of an old drawing board along two edges of which are screwed two blocks of wood, the inner faces of which are planed to the angle of slope of the casket sides. They need only be about $\frac{3}{4}$ in. in height (1 and 2 on the diagram).

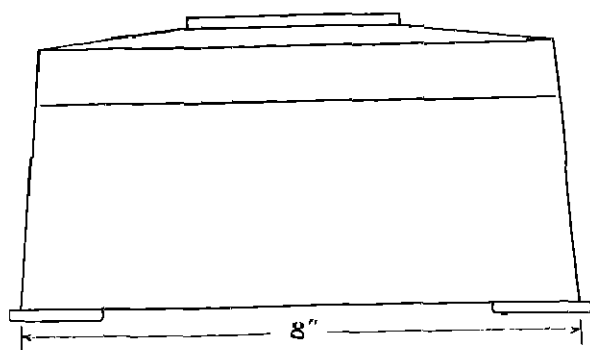
Two corresponding lengths (3 and 4 on the diagram) are prepared with one face planed to the same angle, but are not screwed down. The sides of the casket are prepared and fitted together so that one corner is in position between the two fixed guides, as indicated. Guides 3 and 4 are then fitted closely to the sides and the brads are tapped in sufficiently to hold them firmly. Another piece screwed under the board will enable the whole thing to be held in the vice.

For thicker stuff in which it is desired to make sound joints, the splayed mitre dovetail will be needed. The other diagrammatic details show how the tails are splayed to keep the length of the grain in conformity with the length of the side, the splaying being in relation to the shoulder lines on one face, and to the inner and outer faces of the stuff on the end grain of tails and pins. This joint is no more difficult to make than the ordinary secret mitre dovetail, providing full and correct use is made of the sliding bevel when setting-out.

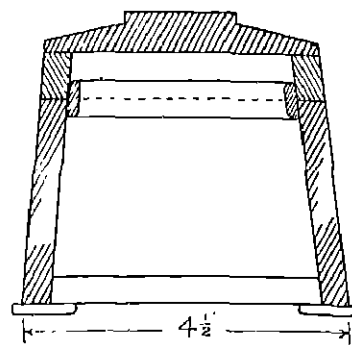
The bottom may be carefully fitted inside the casket and glued into place. The top may be solid, shaped to reduce the end grain to a minimum, and glued and pinned on. If not to be hinged, a lining fillet is fitted and glued to guide the lid and hold it in place, but this is done last of all after the box has been veneered, sawn through, and cleaned up.

Owing to the sloped surfaces, the top cannot be done by overlaying and cutting through both thicknesses of veneer. Each piece should be fitted separately, working from the first one which is laid as soon as fitted. The projecting flat portion is not veneered.

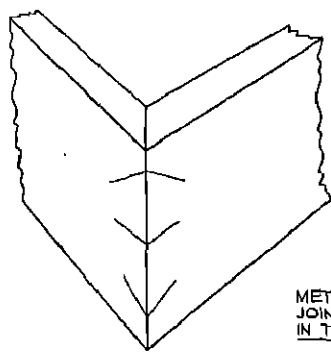
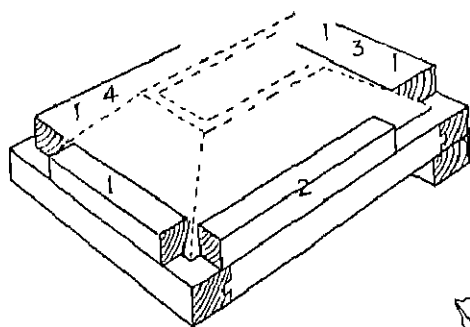
The jointed and veneered casket will test the craftsmanship of the best workers in the class, but only the best should be allowed to tackle it.



ELEVATION



SECTIONAL ELEVATION



METHOD OF JOINING CORNERS IN THIN STUFF

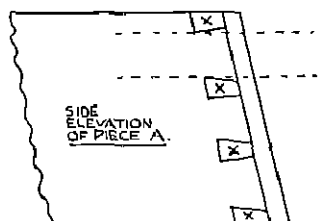
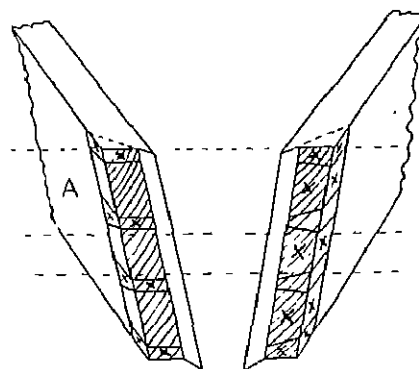


FIG. 19. CASKET

BEDSIDE TABLE.—This construction is quite straightforward (Plate XVII and Fig. 20) the only fresh difficulty being the cutting of stopped grooves to take the panels at sides and back in the legs. As most workshops now include a universal plane in the special list of tools, this will perform the operation cleanly by taking off the detachable portion of the apron and nose, and cutting the groove right up to the end.

The shelf is not housed in to the rails, but is held by fine screws cleared through fillets, themselves screwed to the rails. The housing is avoided in this instance as it makes the table awkward to glue up.

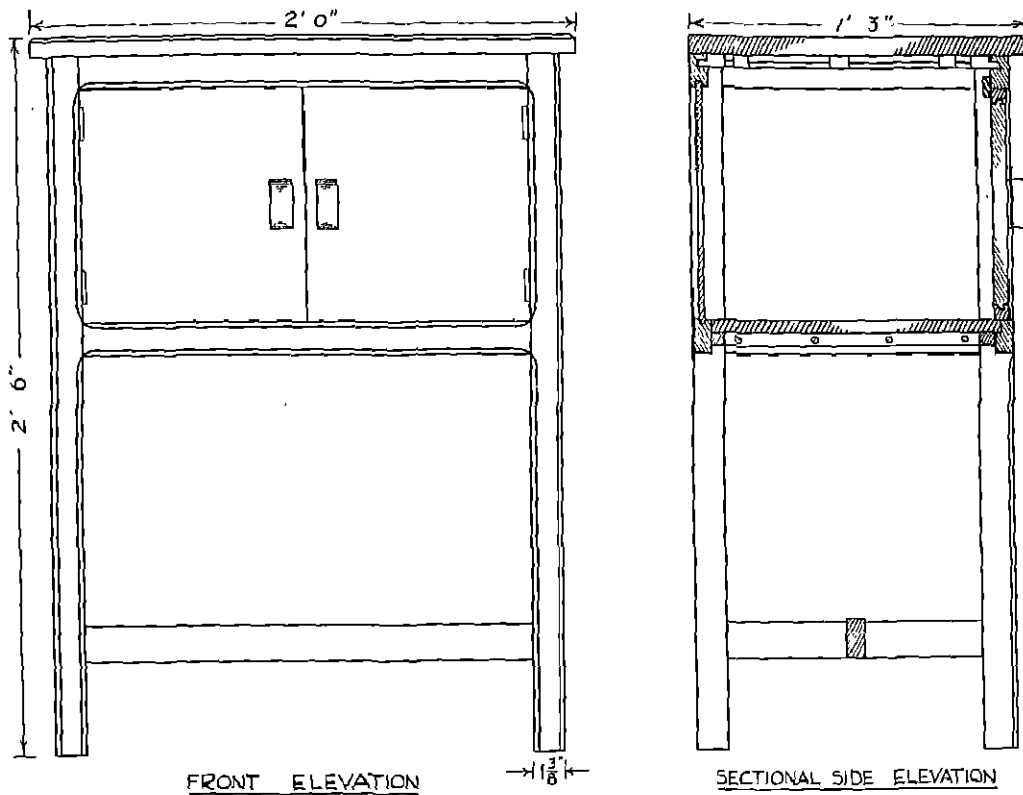


FIG. 20. BEDSIDE TABLE

In assembling the table the customary procedure is followed. The end frames first are fitted dry in the cramps to see that they are not in winding and that the joint shoulders are tight up; also, that the side panel is not too big, thus holding the shoulders apart. The button groove in the top rail is ploughed on each frame, and on top front and back rails at the same time. (If preferred, the shelf may be buttoned to the bottom rails in the same way.) The end tie rails or stretchers also are tested at the same time.

The sides are then glued up and, later, the front and back rails, back panel, and centre stretcher are cramped up dry for testing. When satisfactory the table is finally glued. The doors are solid, veneered. They are fitted and swung; pull fitted, and top buttoned on to complete.

It will be seen that the centre stretcher is slightly cambered on its top surface along the

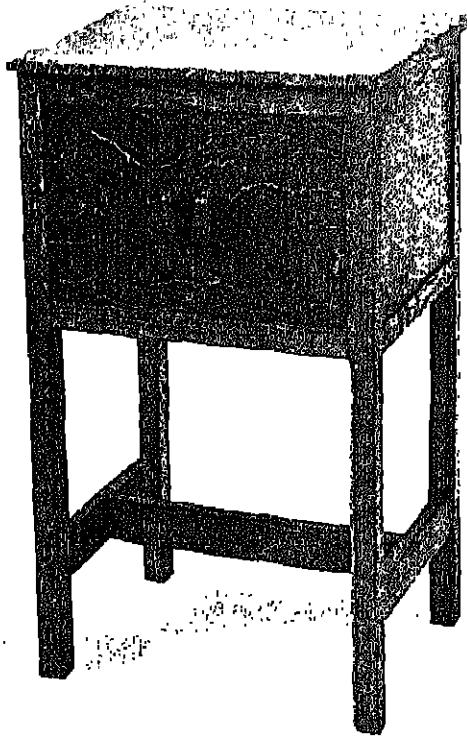


PLATE XVII. BEDSIDE TABLE

length. The amount is slight, as shown in the side view, but it prevents the appearance which it might otherwise have of sinking in the middle—an optical illusion which is counteracted in a similar way in building construction where wide lintels and beams are concerned.

Wax polish is the finish applied. No previous oiling is done, as this tends to give a yellowish tinge to the colouring, and the natural greyness of the oak is preferred occasionally. If figured oak is used, the surface may be burnished with coarse canvas to bring out the gleam of the medullary rays.

LIGHT FOLDING TABLE.—This table of a design specially suited to light oak (Plate XVIII and Fig. 2r) makes a pleasant and ornamental feature as one unit of a complete scheme. Being lower than normal in height it is convenient for use alongside an easy chair, and when not in use can be folded and placed against a wall or in a corner without losing its value as a table.

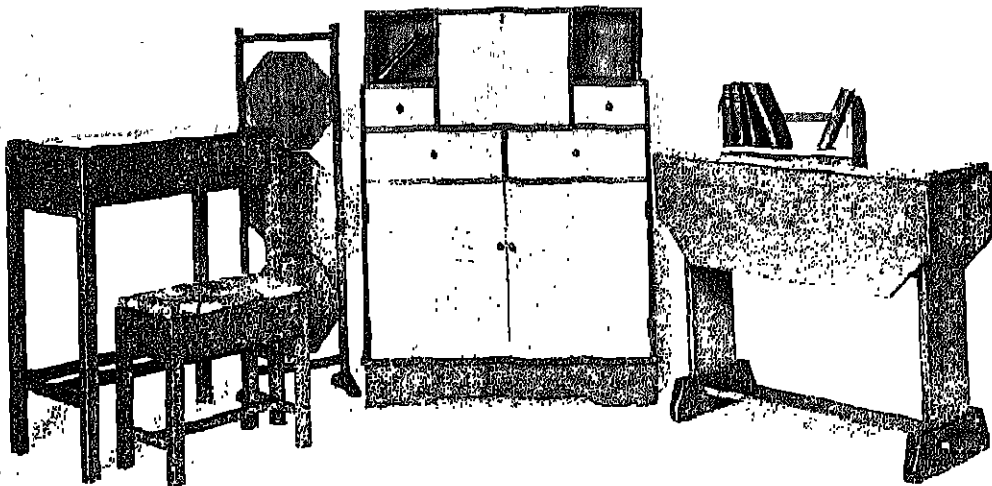
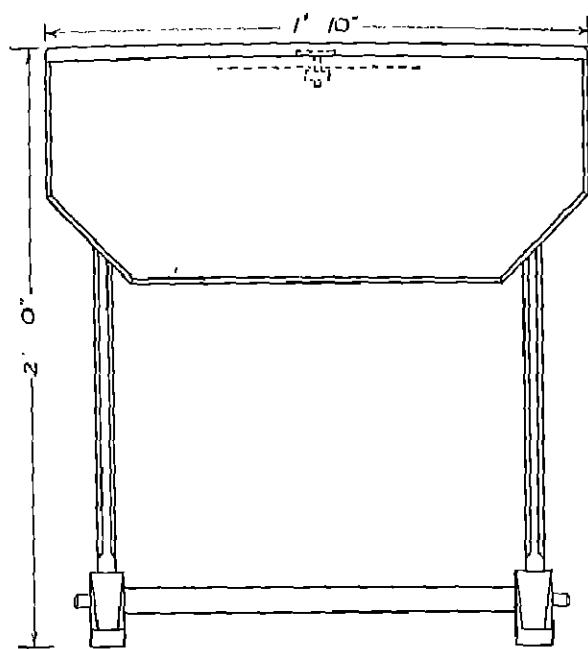
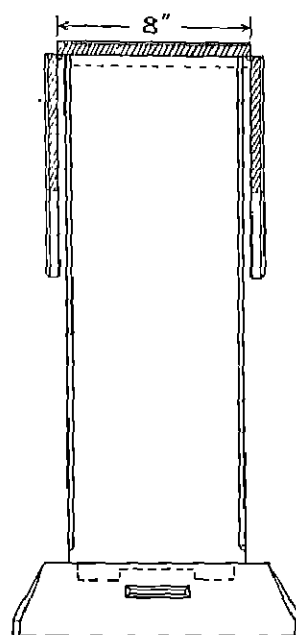


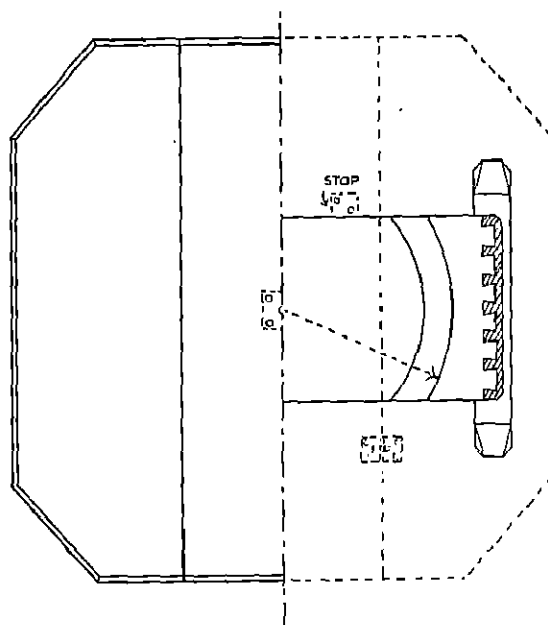
PLATE XVIII. OCCASIONAL TABLE, FRAMED STOOL IN OAK, CAKESTAND, BUREAU IN SYCAMORE AND WALNUT, BOOKRACK, AND LIGHT FOLDING TABLE



SIDE ELEVATION



END ELEVATION



PLAN WITH HALF TOP REMOVED

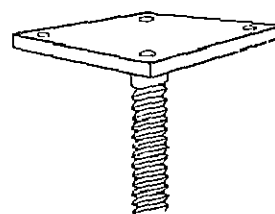


DIAGRAM OF
PLATE USED
UNDER TOP

FIG. 21. LIGHT FOLDING TABLE

Some tables of this type have a wooden pin about which the top revolves, but the fitment shown in the diagram is neater and harder wearing. Some difficulty may be experienced in obtaining a plate such as the one illustrated, but a local blacksmith or garage will usually oblige at a very small cost, by welding a bolt (the head sawn off) into a plate, after which the screw holes may be drilled and countersunk. A piece of mild steel sheet, No. 12 gauge, such as is commonly used in the metalwork shop, will suffice, and a washer for the nut is easily obtained.

If the joints are well made, the table will be a firm, sound job. The upright ends are double-tenoned into the feet, whilst the broad stretcher is tenoned right through them, the tenon being brought out to form a decorative feature. If desired, the tenons of the uprights may be lengthened and widened, and notched across the stretcher tenons, a method which locks the whole joint in each foot, and by gluing up more than balances the slight weakening of the stretcher tenons.

The tops are plain hinged without the use of the rule joint, and for these brass back-flap hinges are necessary, about $1\frac{1}{2}$ in. The rule joint (see section on *Woodwork Joints*) makes a much neater job, but it is a difficult exercise for work in the day school.

Owing to the method of hingeing, it is necessary to cut a shallow groove on the arc of a circle taken from the centre of the pin for the knuckle of the hinge to swing across the under top rail, at each end as indicated. This rail is lap-dovetailed to the uprights.

A stop is needed, screwed to the underside of the top at the position shown, to decide the extent of the turn through which the table top may be moved and to keep its edges in alignment with the framing when the top is folded.

The shaping of the top, and the use of a variety of stopped or through chamfers, will give all necessary ornamentation, and the greater the restraint used in the application of these, the better will the final appearance be.

Well-seasoned wood should be chosen for the top and flaps, as these are not cleated. Should warping take place when the table is kept in a warm room, the job will be spoiled. If seasoned wood is not to be obtained, it is advisable to fit wide cleats tongued and grooved to the ends of the three top sections, and to take off them merely the extreme corners.

Plain wax polish is the best finish for this job.

BOOKSHELVES WITH CUPBOARDS.—This job may be used as a small, low dresser, or alternatively as a set of book shelves, Fig. 22.

As the joints may be sprung by any careless handling, and as previously noted dovetail housings are not recommended, the two shelves enclosing the cupboards are housed for $\frac{1}{8}$ in. depth to within $\frac{1}{2}$ in. of the front edges, and in addition are double-tenoned through the remaining thickness of the sides, one tenon about $1\frac{1}{2}$ in. wide being placed 2 in. from each edge. These are cleaned off flush after being diagonally wedged from the outside. This construction in oak does not give an ugly or clumsy appearance to the sides, but makes quite a neat and strong finish.

For lightness, the back is a single sheet of three-ply, oak-faced on the inside, but if desired the whole back can be framed-up and panelled, the extra thickness being taken off the back edges of the shelves and top rail. This, however, means adding greatly to the time taken over the job, as well as to the weight and cost.

The doors are framed-up and panelled, the inner edges of the top and bottom rails only being quarter-rounded to soften the framing lines.

Glue blocks under the bottom shelf, at the ends, are not actually necessary if the

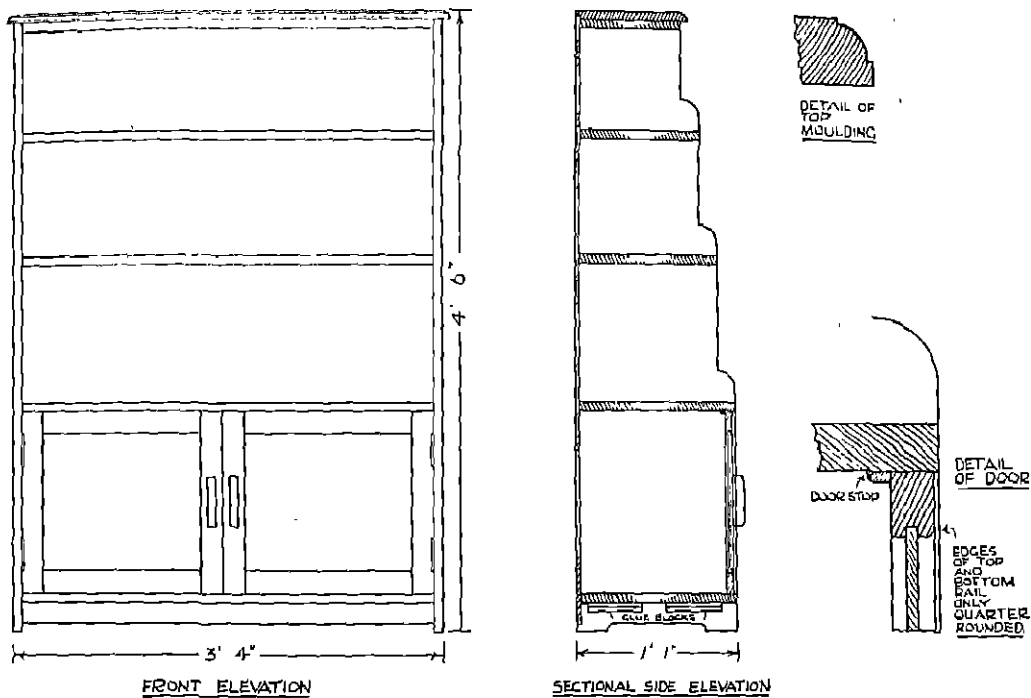


FIG. 22. BOOKSHELVES WITH CUPBOARDS

construction suggested is used, but they give surprising additional strength to the joints. The top is screwed on from inside.

This particular job looks quite well as a small kitchen dresser if carried out in whitewood and stained and polished.

OCCASIONAL TABLE.—This table (Plate XIX and Figs. 23a and 23b) may be carried out in several different styles. The one illustrated is of mahogany with sycamore veneered drawer fronts, edged with black line. The combination may sound somewhat startling, but the actual appearance is very pleasing and this piece would take its place in company with the clock case shown earlier, and several other pieces designed to match.

The side and back rails are double-tenoned to the legs, and a tie rail is tenoned beneath the drawer rail, being set in $\frac{1}{8}$ in. from the leg faces. The centre partition is faced with a strip the width of the drawer rail, as shown in the detail diagram at D. Other constructional details shown in this diagram are as follows:

Top front rail (A), dovetailed into leg top, notched round leg and dovetailed into side rail, thus locking the corner securely.

Leg (B).

Drawer rail (C), tenoned into leg and mortised for partition. Under it is seen the tie rail, which is partly for decoration, as the shadow line thrown over it by the projecting edge of the drawer rail above gives the impression of a moulding line under the drawers, and a more finished appearance to the table.

Partition (D), with facing strip tongued and grooved on: double-tenoned for both rails. "Kickers" for drawers omitted.

Back rail of table framing (E), with housing for partition and groove for top buttons. This rail is tenoned to legs.

Drawer runners (F and G) on which drawers slide, screwed to rails and partition. Duplicated on sides not shown in diagram.

End rail of table framing (H), tenoned to leg, and to which is screwed drawer runner, G. To it also is glued the drawer guide which is thickened to come flush with the inside face of the leg, and which rests on and is also glued to the drawer runner, G.

Under the table top, and glued to it and to the top edge of H, is a strip thickened to

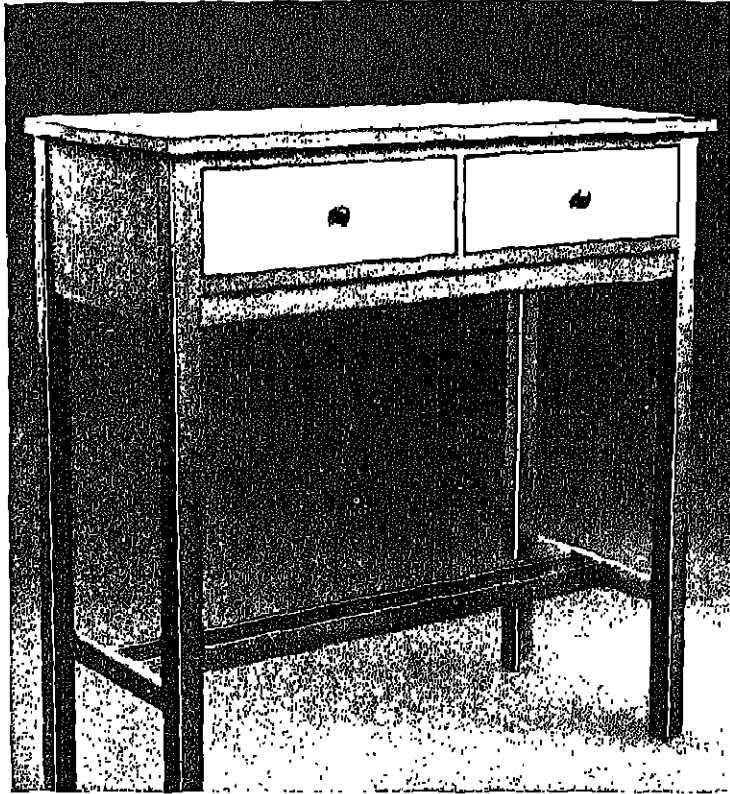


PLATE XIX. OCCASIONAL TABLE IN MAHOGANY, WITH DRAWER FRONTS VENEERED IN SYCAMORE AND EDGED WITH BLACK LINE

fit flush with the underside of rail A. This is the "kicker" which prevents the opened drawer from dropping at the front. As this is needed, the ends of the top are not buttoned on, but are slant-screwed and countersunk through the end rails of the framing in two places. This countersinking is done with the gouge; the clearance holes should be bored downwards from the top edge of the rail at an angle. This is done so that certainty ensures the clearance hole being about two-thirds of the way across the thickness at the edge. The table top is buttoned along the back, and screwed on up through rail A at the front.

Working procedure is the same as for other tables, but it must be ensured that the two long stretchers of the underframing are marked together across the shoulders, as many such

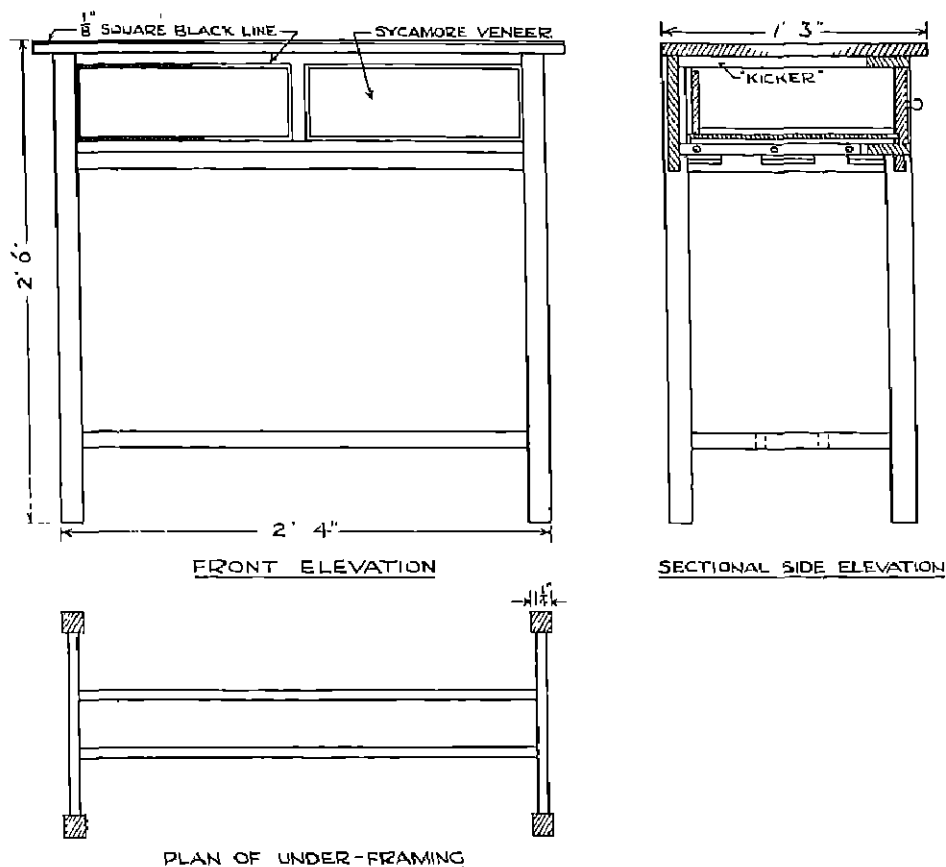


FIG. 23A. OCCASIONAL TABLE IN MAHOGANY

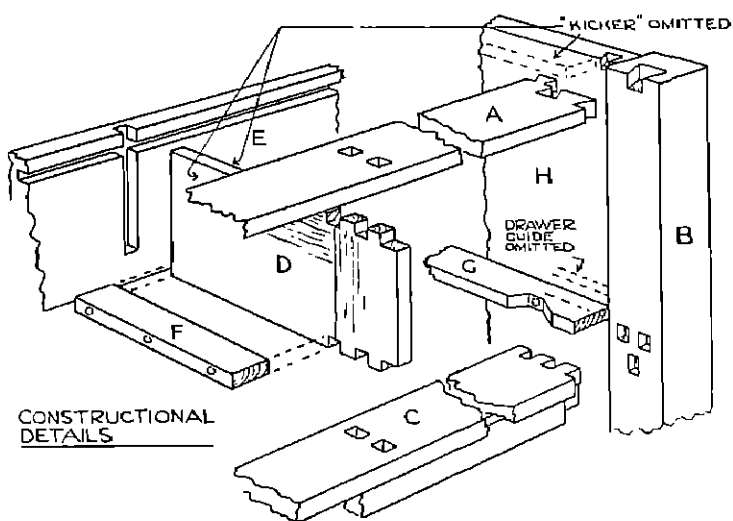


FIG. 23B. OCCASIONAL TABLE IN MAHOGANY

A. Top front rail. B. Leg. C. Drawer rail. D. Partition. E. Back rail of table framing. F. and G. Drawer runners. H. End rail of table framing.

framings are spoiled by one of the parallel members being bowed owing to a slight difference in length between them.

The table is cleaned up; the grain "raised" with warm water; papered down; stained with potassium bichromate (a saturated solution to which is added a pinch of potassium permanganate to warm the colour and to "carry" it into the grain); papered, stained and papered again with No. 0 paper; grain-filled, dried and papered yet again; the dust removed carefully; and finally polished with wax polish several times at intervals of at least one day. This allows the turpentine to evaporate, and the wax to harden before another application takes place. Only a little wax should be used, with plenty of rubbing each time.

When staining, the top edge only of the drawer fronts should be treated, the rest of the drawers being left natural colour.

The black line, of course, is put in before staining, and the sycamore veneer is untouched by stain.

Plate XIII shows a similar table carried out entirely in Japanese oak, in addition to the one detailed above. The only difference in construction is that the top of the oak table is set back from the edges of the legs and rails by $\frac{1}{2}$ in. all round.

BEDSIDE TABLE.—The carcase of light oak or walnut in this job (Plates XX and XXI and Fig. 24) is through-dovetailed, but the pins are made use of as a decorative feature by

being brought through as shown in the detail diagram. They may spring direct from the shoulder line, or be advanced about $\frac{1}{8}$ in., after which the projecting portion may be shaped as shown, or chamfered in some other way. The appearance given by this treatment is very pleasing but, as a style, it should not be adopted for one article only. It will, however, harmonise quite well with other pieces in a suite which have through tenons, dry-wedged on the outside.

The back is framed-up and panelled.

On the example illustrated, the doors are framed-up and flush-fronted, doors and drawer being fitted with European walnut pulls, and finished with a $\frac{1}{8}$ in. square walnut line round the edges.

The job is unstained, but oiled and wax polished.

Being a fairly heavy job, the footings are strongly tenoned and two rails, 3 in. wide, are dovetailed in from front to back, one near each end. (One is seen in the sectional view.) The footing is then screwed securely through these into the carcase bottom.

The photographs show two other alternative designs for tables of this kind.

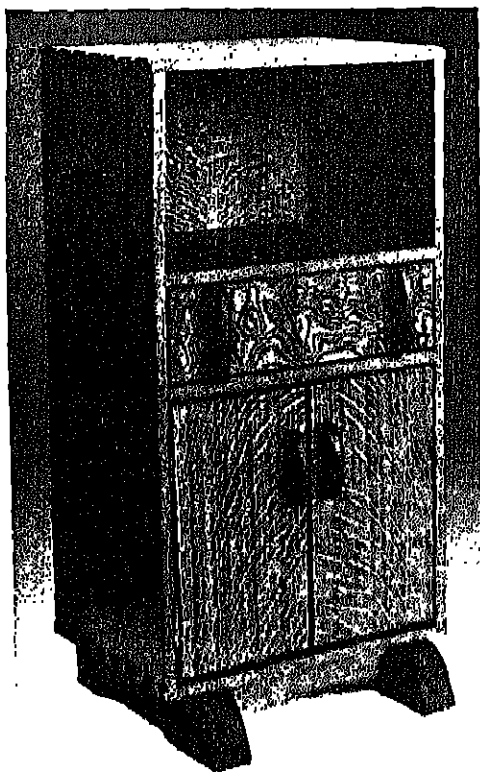


PLATE XX. BEDSIDE TABLE

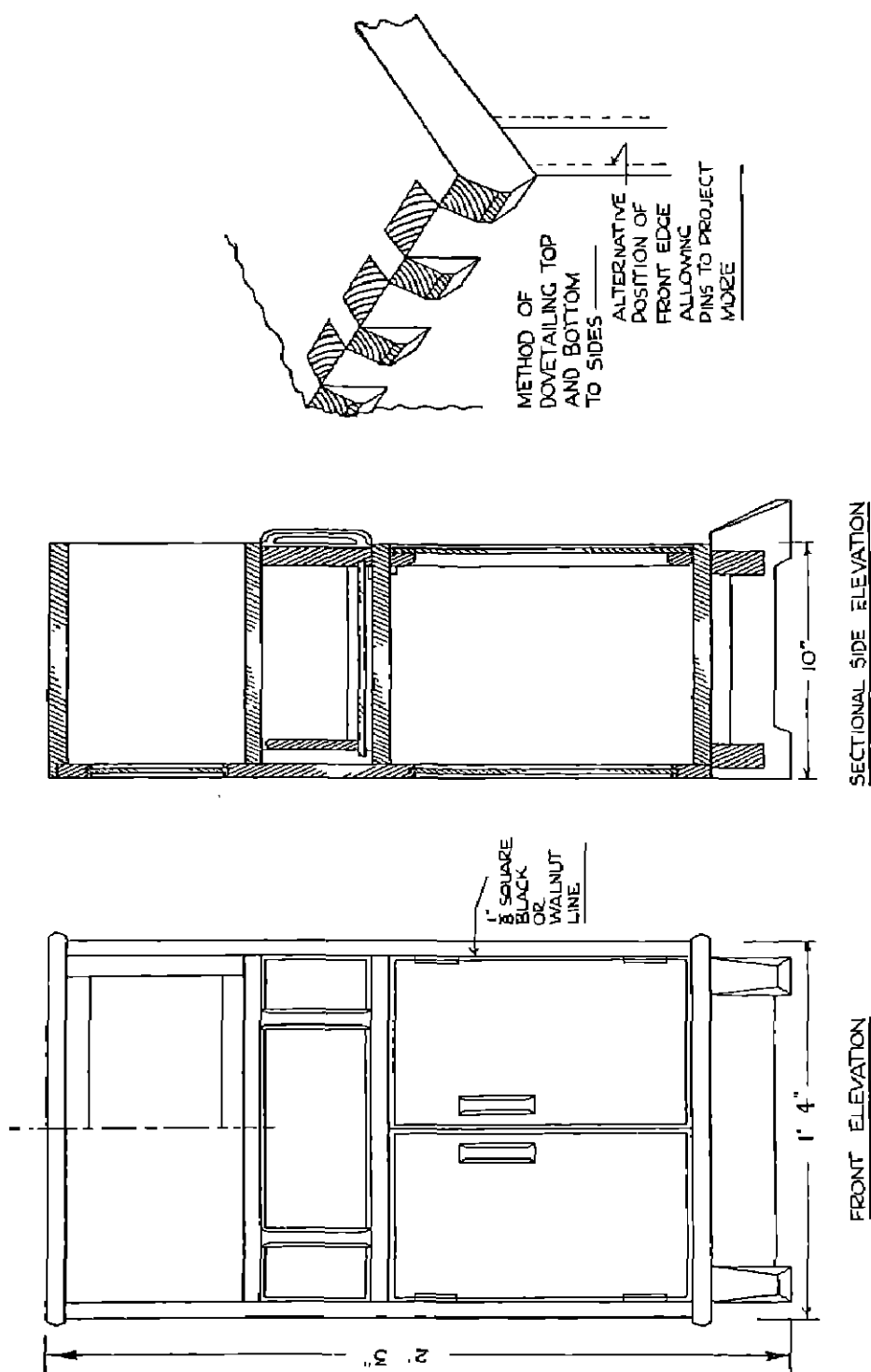


FIG. 24. BEDSIDE TABLE FOR LIGHT OAK OR WALNUT

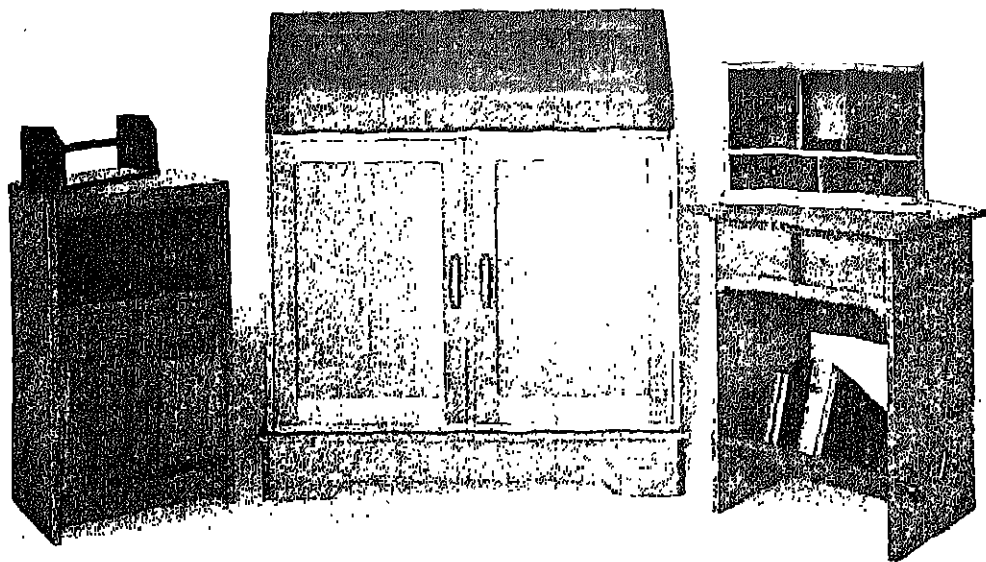


PLATE XXI. TWO ALTERNATIVE DESIGNS FOR BEDSIDE TABLES; ALSO BOOKRACK, BUREAU IN LIGHT OAK, AND STATIONERY CABINET IN WALNUT AND MACASSAR

NEST OF TABLES.—This design in light oak or walnut (Plate XXII and Fig. 25) would be in keeping with any ordinary style of modern suite in these timbers with which easy chairs would complete a pleasing scheme. It is intended for use in a lounge or in a small room in which the ordinary type of low table would cramp the accommodation.

It consists, as the diagram shows, of one small table on the footings of which slide two slightly smaller ones—one fitting in from each end. The smaller tables have no footings.

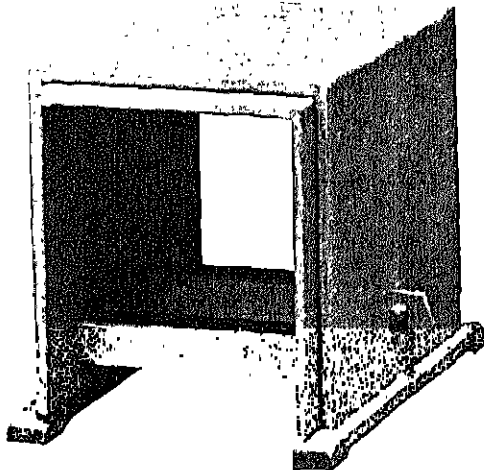


PLATE XXII. NEST OF TABLES IN LIGHT OAK

The outer table is through-dovetailed together, the extreme top edges being bevelled off slightly. A fairly deep stretcher ties it below the centre, the tenons being brought through and dry-wedged on the outside—largely as a decorative feature. The two sides are tenoned into the footings towards the outer edge to allow sufficient width for the inner tables to stand on them.

Each of the two smaller tables is dovetailed in the same way and has a lighter stretcher tenoned in, but cleaned off flush and wedged. When slid home, the inner tables should project beyond the outer one

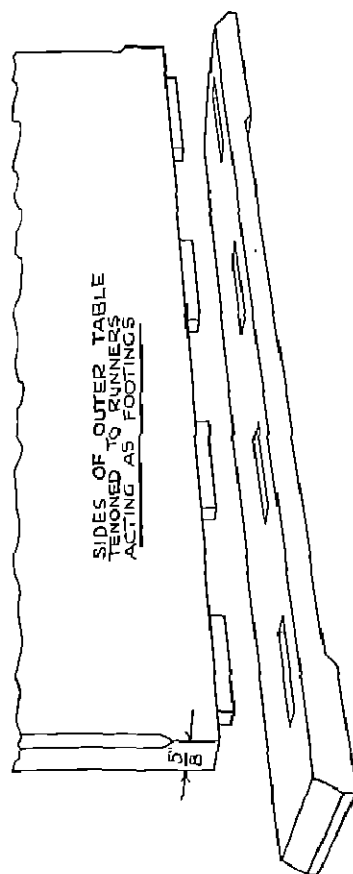
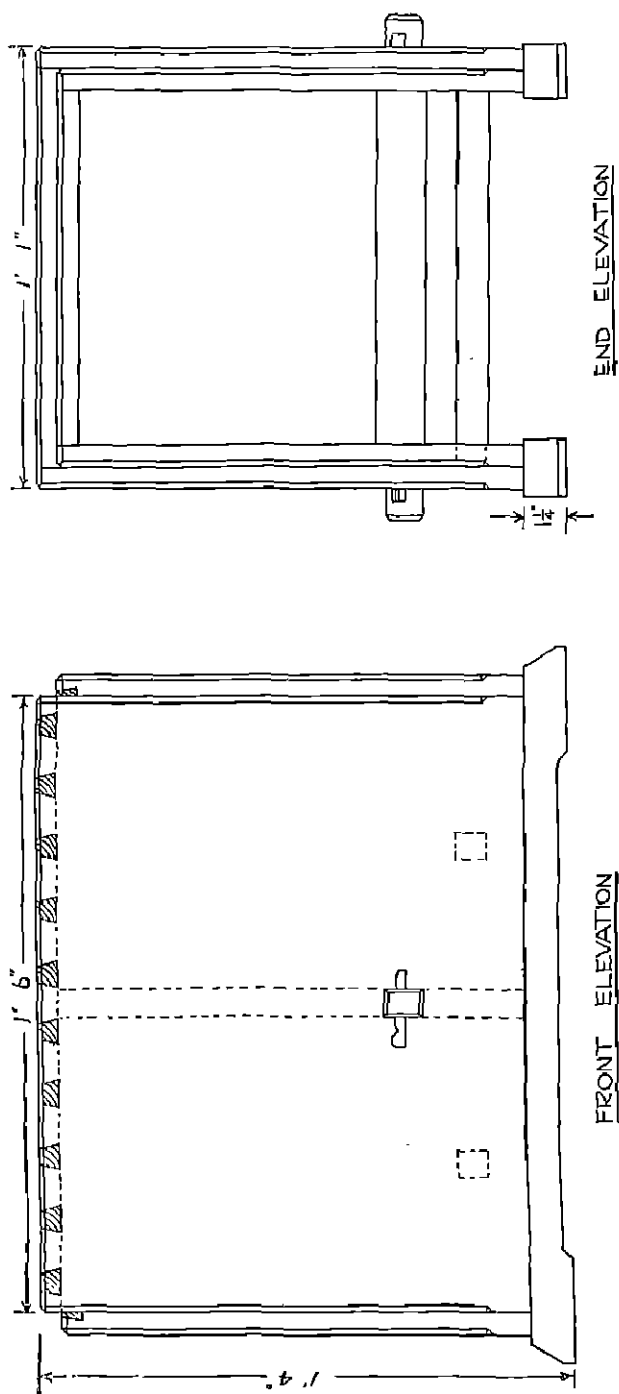


FIG. 25. NEST OF TABLES IN LIGHT OAK

about $\frac{3}{4}$ in., while at the centre they rest against the stretcher of the main table. The whole job can then be carried about as wanted.

The through-dovetailing is an exacting test, as every tail and pin is open to inspection, but this joint is not so difficult to make if the marking out and procedure is correct, while the final appearance is well worth the extra trouble involved.

The bottom edges of the inner tables should be covered with baize.

LOUNGE CHAIR.—The construction of this chair (Plate XXIII and Fig. 26) is straightforward, and its final appearance with loose cushions is quite pleasing. The example shown

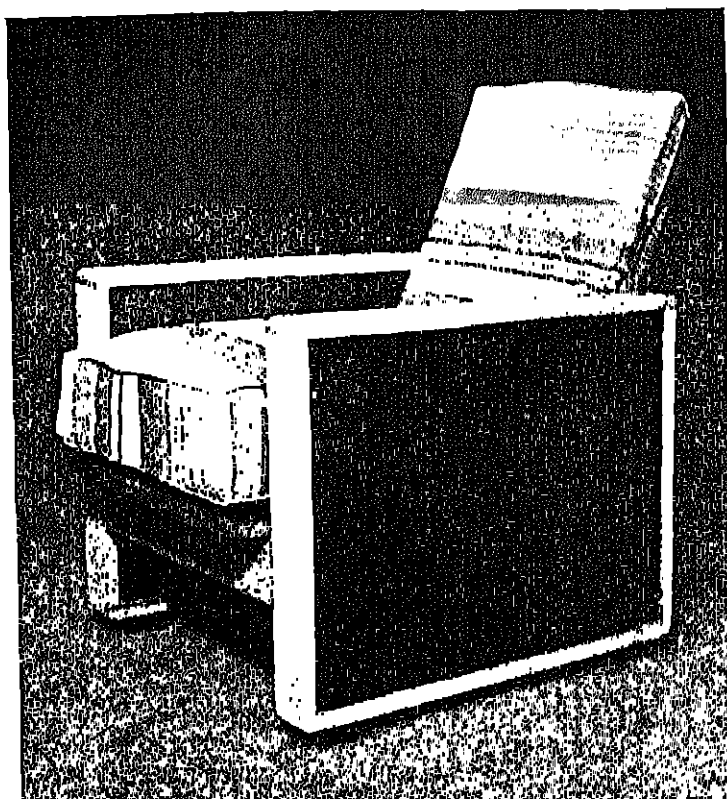


PLATE XXIII. LOUNGE CHAIR

has the sides framed in sycamore, the panels being stained down dark and the cushions covered with the popular "folk weave" material.

The remainder of the framing can be of oak, as also the seat frame and back. For cheapness and hard wearing qualities, the under framing of the chair can be made of birch or beech if available. The actual quantity needed is small.

Seat frame and back are hinged together, the seat sliding along the supporting rail which is jointed into the uprights as shown, and made wide enough for that purpose. This rail is strengthened on each side and supported in turn sufficiently to take the weight on the seat by being blocked underneath with uprights of 1 in. stuff, tenoned in at top and bottom. Usually these are merely nailed into place, a method which may be effective enough but is

ly sound constructional training for the school workshop course. (It is an old joke among handicraft teachers that when, in the ideal workshop, some rustic woodwork has been carried out, an hour has to be spent looking for the nails.)

A wide rail joins the two sides at back and front, the seat frame sliding on the latter. The height of the back is adjusted by one of several methods, the one shown being simple and consisting of a loose rail fitting into slots cut in the sides and engaging with a rack cut in the back framing of the seat.

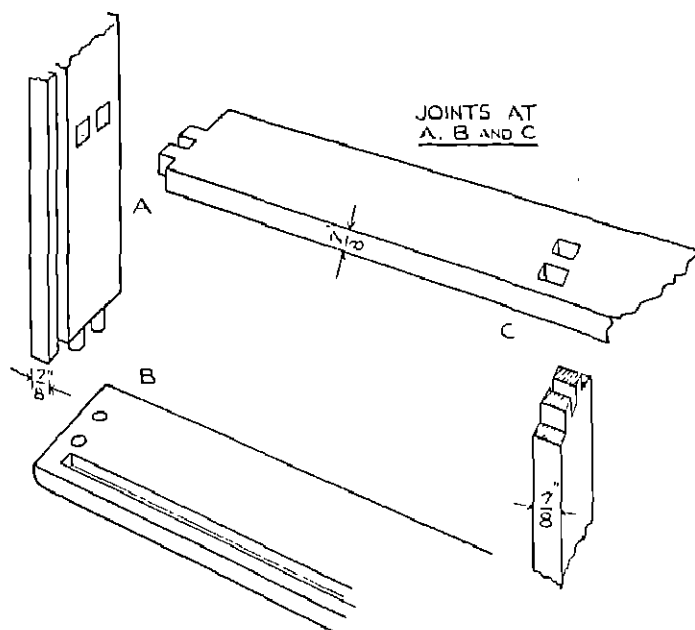
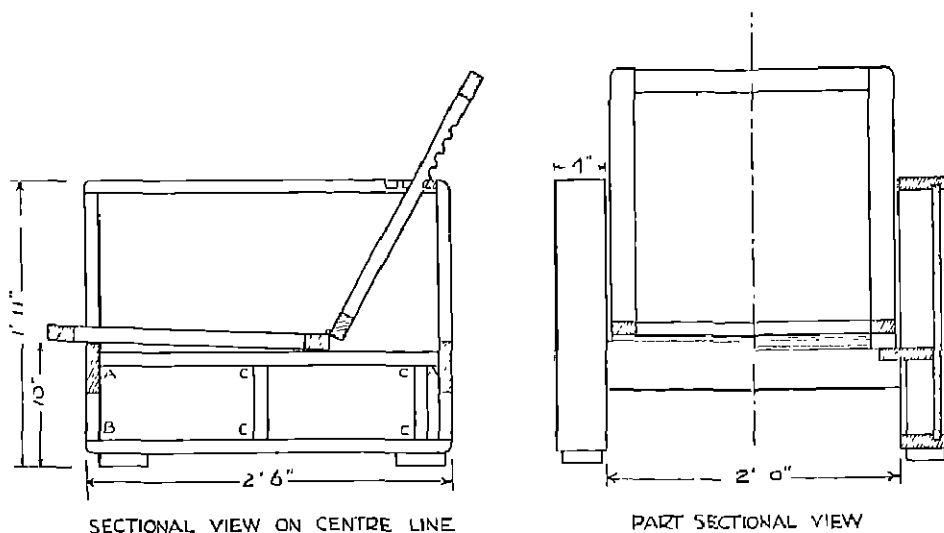


FIG. 26. LOUNGE CHAIR

Seat and back are sometimes panelled, but strong webbing gives a more comfortable foundation for the seat. The back should be panelled to the outside when the rack is used as shown, and the back will be seen.

The detail diagram shows the method of framing the sides. The top and bottom rails are dowelled together, whilst the other members are tenoned in. The corners are then rounded off. Small blocks are fitted under the sides to carry the chair, their edges also being taken off.

In the example shown the side panels are darkened to contrast with the sycamore, and this may be done with a wood dye. Alternatively, 7 mm. plywood, faced on one side with walnut, may be used, and if this is oiled, a fine colour is obtained with the full beauty of the grain. At the same time, the colour is then quite dark enough to contrast well with the framing.

If a higher polish is desired on the arms of the chair to prevent dust and grease getting in the pores and discolouring the sycamore, they may be given a coat of clear (white) polish, well worked in, after which they are papered down and the final finish obtained by waxing thoroughly. There is always a tendency to stand glasses and cups and saucers on these arms—not to mention ash trays—and the wax will stand up to most of these things, whereas French polish will not do so.

RADIO CABINET.—The example (Plate XXIV and Fig. 27) was made in European walnut to contain a home-made set, so that the over-all dimensions given are purely arbitrary. The whole design may be changed without losing the valuable training introduced.

The top carcase is made by secret lap-dovetailing the top to the sides, the bottom con-

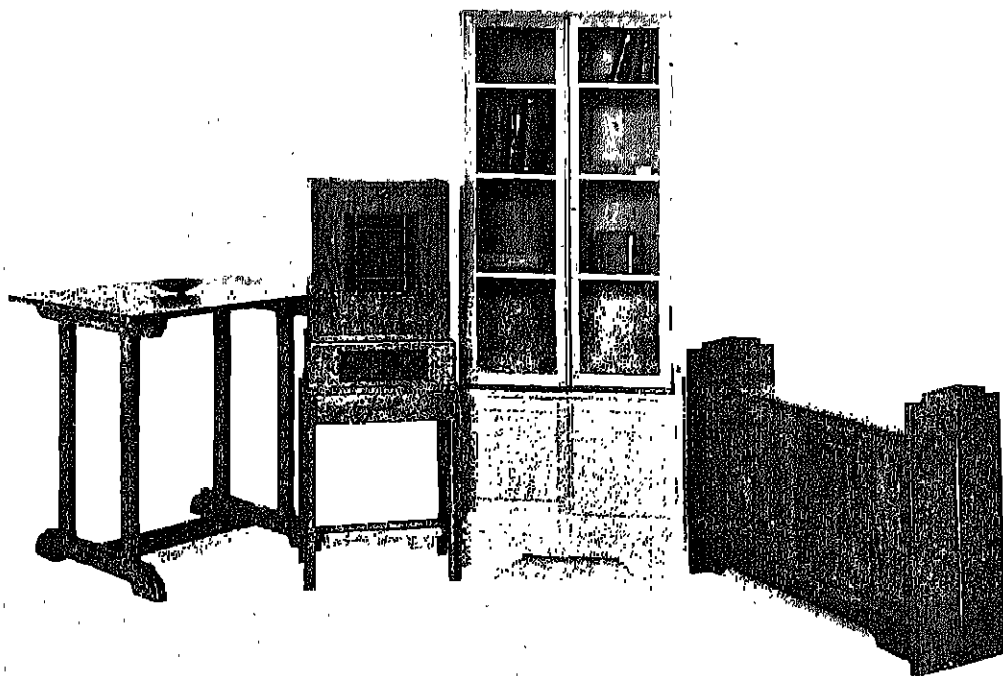
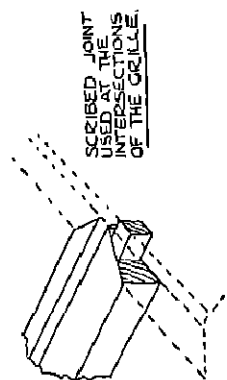
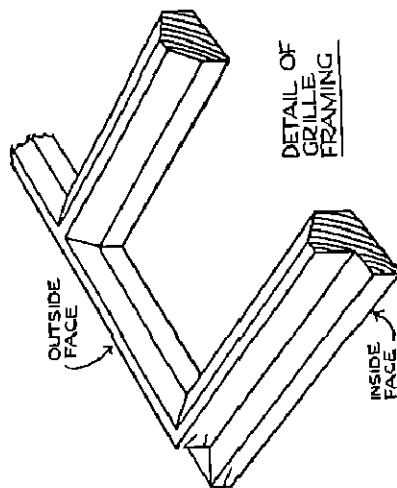
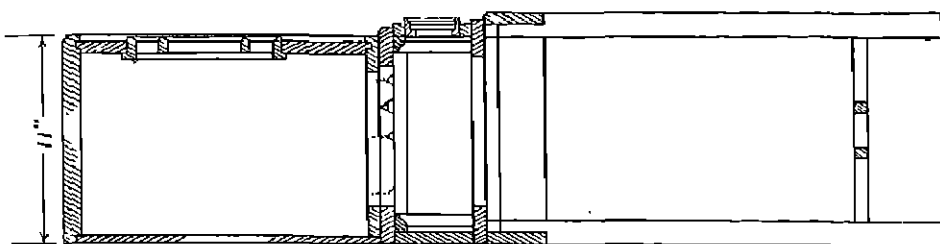
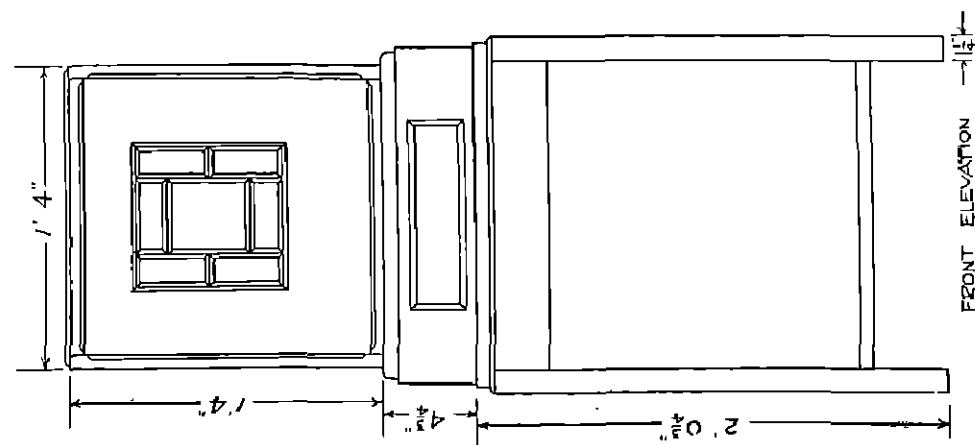


PLATE XXIV. OCCASIONAL TABLE IN LIGHT OAK, RADIO CABINET IN EUROPEAN WALNUT, BOOKCASE IN LIGHT OAK, AND MUSIC STOOL IN OILED BLACK WALNUT (CUSHIONS REMOVED)



SECTIONAL SIDE ELEVATION
FIG. 27. RADIO CABINET ON STAND, IN WALNUT

sisting of two rails plain lap-dovetailed to them with two cross members jointed in, to which the middle carcase is screwed (see A). The front panel is a sheet of laminated board, grooved in round the carcase edges and set in from the front $\frac{1}{4}$ in. The carcase edges are then finished with a stopped chamfer, as shown. The panel is pierced and a square opening is cut to receive the decorative grille, which is built up as shown in the detail diagram, being rebated round the outside edges and fitted in from the back. Alternatively, the rebate can be worked on the back and the outside front of the grille left wider, so that it may be fitted from the front.

The grille is built up of strips of solid walnut, mortised and tenoned together, and worked to a plain bevel on the front edges. This makes it necessary to introduce a variety of scribed shoulder at each mitre, except the outer corners which are butted and keyed together. The whole grille looks very well when fitted into place, and is worth the extra trouble in making. The back is detachable from the top carcase.

The middle carcase is made like a plinth, and has a wide capping moulding which is screwed down on to it. This is then used for screwing through, up into the cross members of the top carcase. This middle carcase is pierced at the front to take a control panel, and edged with a similar moulding strip to that used for the grille.

The stand is framed-up with the front and side rails flush with the leg surfaces. It also has a capping moulding strip which actually is screwed to the under edges of the middle carcase. The stand is fixed to this by screwing up through its cross members into the moulding strip above.

A piece of silk of harmonising colour is stretched behind the grille to finish the front, and is lightly glued and held in place with a narrow wood fillet glued to the inside of the top carcase.

The whole job is oiled and wax-polished.

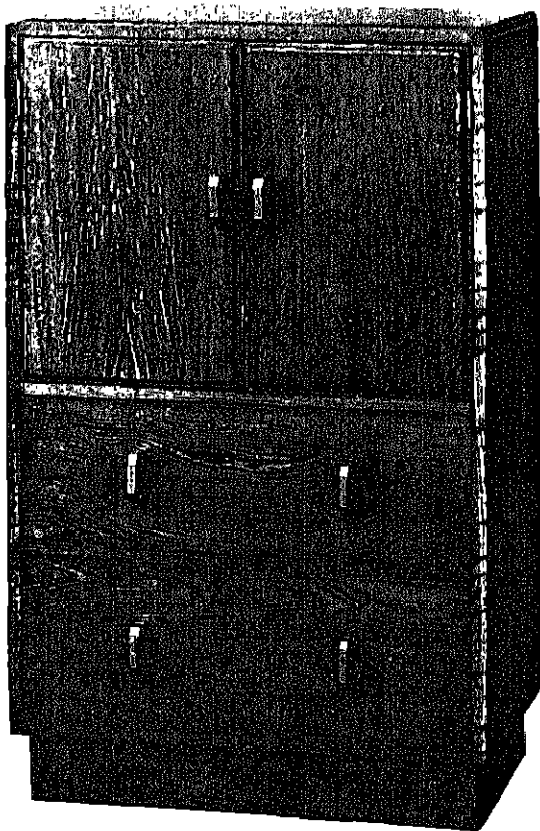


PLATE XXV. OAK CHEST

OAK CHEST.—This job (Plate XXXV and Fig. 28) though not so very large, has a great deal of work in it and is somewhat costly to make. It is a useful project for the evening class student and may be begun, as suggested earlier, in the day school.

Constructional details are the same as for earlier examples having a similar carcase basis, secret lap-dove-tails being used at the top and plain lap-dove-tails at the bottom.

The doors are framed-up and flush panelled to the front, being finished with a sheet of faced plywood planted on and brought to within $\frac{1}{4}$ in. of the door edges.

The plinth, which is recessed for $\frac{5}{8}$ in. on the front and sides, is screwed

on from inside the carcase bottom and reinforced with glue blocks underneath. The back is framed-up and panelled.

Wood pulls are shaped and fitted, and the whole job is stained down to mid-oak and then wax-polished.

The staining is done with Vandyke "crystals" (water stain) mixed to a strong solution in hot water. A pinch of potassium permanganate is added to warm up the colour and to carry it into the grain. Several successive stainings will be necessary, with papering in between, but the resulting colour obtained by this simple recipe is very pleasing and, although

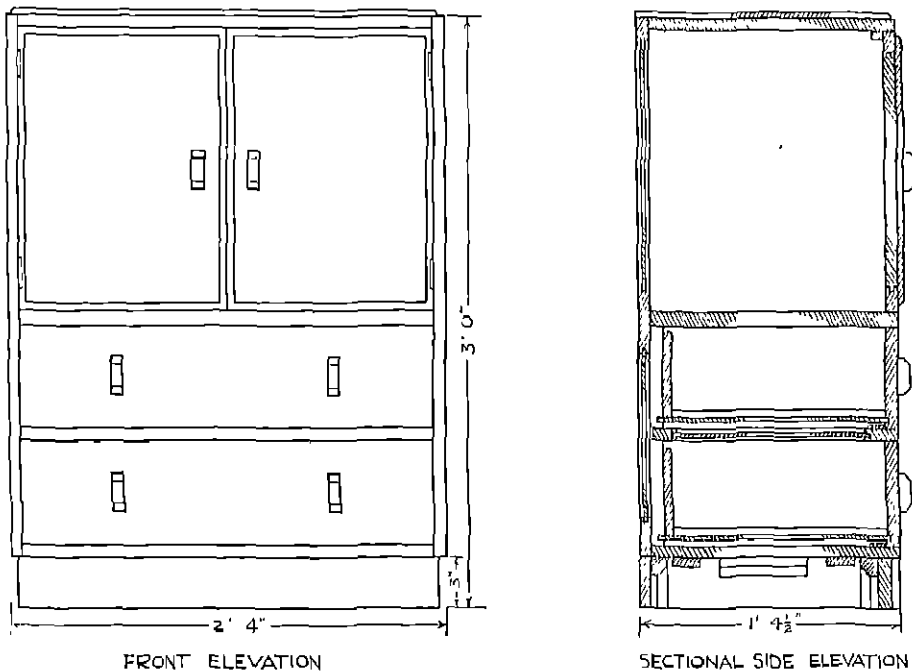


FIG. 28. OAK CHEST

it looks somewhat dead before polishing, the wax changes the tone completely and brings out the warmth. The stain is best applied with a stain-dampened sponge over wide surfaces, as the use of a brush tends to make it streaky where the strokes overlap.

BOOKCASE.—This model in light oak (Plate XXVI and Fig. 29) is a more advanced design based upon the one illustrated on an earlier page.

The case is dovetailed together, through-dovetails being used at the top and rounded off as shown in the detail diagram. Plain lap-dovetails at the bottom, and housings for the shelves, complete the carcase. The back is framed-up and panelled as shown.

Jointing of the plinth footing is by mortise and tenon, with two cross members dovetailed in as shown in the detail diagram.

A note should be made of the method of advancing the outside shoulder at the top back of the carcase to allow of running the splayed rebate for the back framing right through to the top, and covering it neatly.

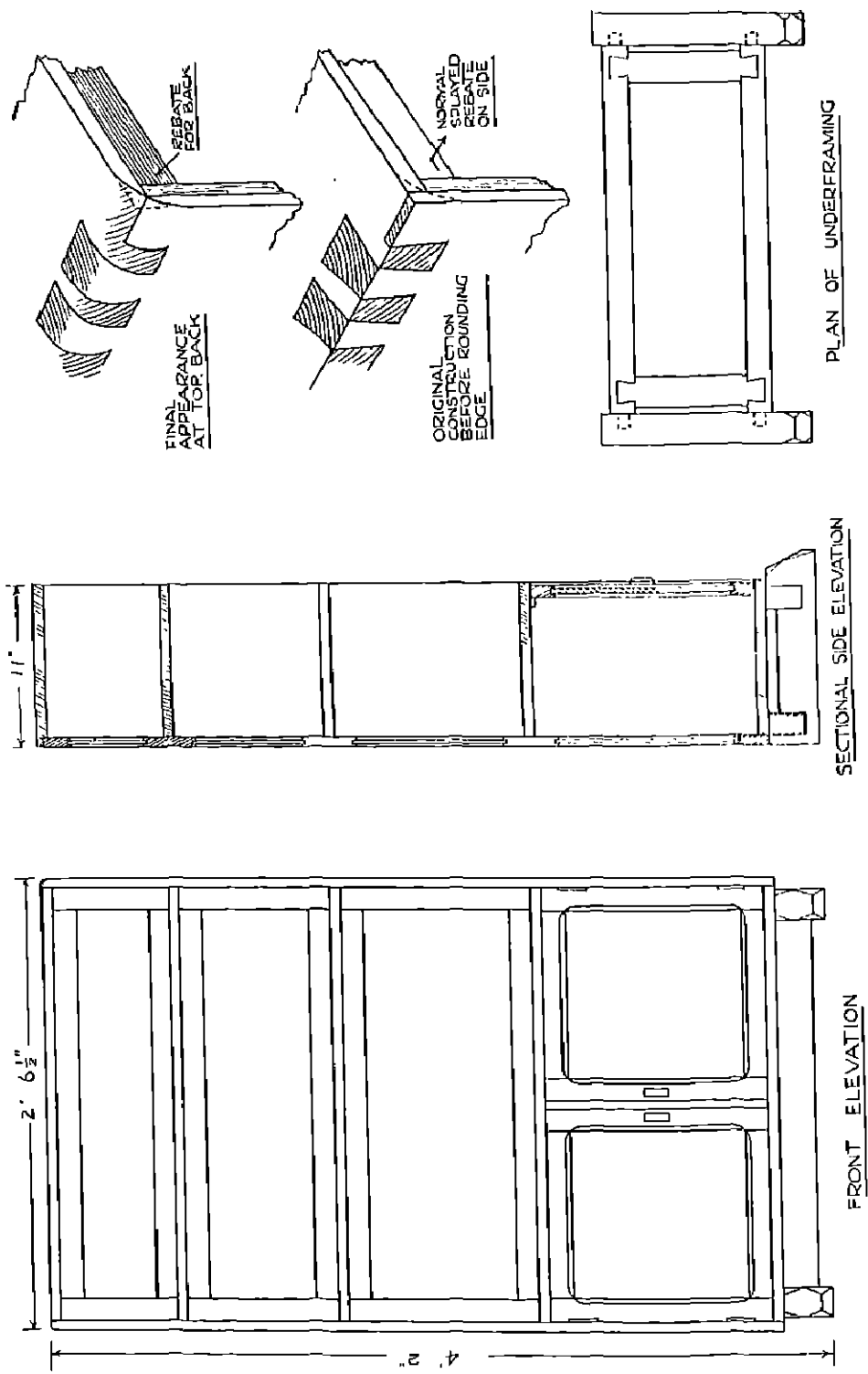


FIG. 29. BOOKCASE FOR LIGHT OAK

The doors are framed and panelled in the normal way, being finished with a running chamfer round the inner face edges.

Attachment of the plinth is made by screwing up into the carcase bottom through the two cross members.

DRESSING TABLE.—Of simple straight lines, the constructional details of this table (Plate XXVII and Fig. 30) are as follows (see detail diagram):

A shows a solid end dowelled to leg.

B is the front leg.

C is a shelf, housed into the side and stub-tenoned into the legs. It is housed for vertical inner sides.

D is an inner side, shouldered and housed into a shelf.

E shows the top rails, dovetailed into legs and sides.

F is the back, which may be a sheet of plywood fitted right across, or may be framed and panelled to fit the carcase only, the section behind the middle shelf and mirror being left open.

The top back rail on each side carcase top, the partitions and shelf are all set in from the back face of the back legs by the same amount as the thickness of either the plywood back or the back framing, as the case may be.

On each side an outer top is buttoned and screwed on to the top rails and is set in from the outside end and front edges only, being flush with the inner face of each partition and the back.

The weight of three mirror plates being considerable, the standards carrying these are made of $\frac{7}{8}$ in. stuff, $1\frac{3}{4}$ in. wide at the base and tapering to the top. The base of the standard is cut out to allow $\frac{3}{4}$ in. of the width to be carried down the back behind the partition, to which it is screwed through the back. As the grain of the outside tops runs from side to side, a portion of the thickness of the standard base is tenoned through them, so adding to the security of the joint.

The bottom of the table is not solid, as is the shelf, but is framed with front and back rails tenoned into the legs. Between these rails are stub-tenoned two others, one at each end acting as a drawer runner and fitting up to the solid side. All four are ploughed round their inner edges for a plywood dustboard, as shown in the sectional view.

Drawer guides (not shown) must be fitted on the centre shelf between the legs, and on the drawer runners of the bottom framing.

Pivot fittings are obtainable for the unframed mirror plate in the centre section, and hinged fittings for the side wings.

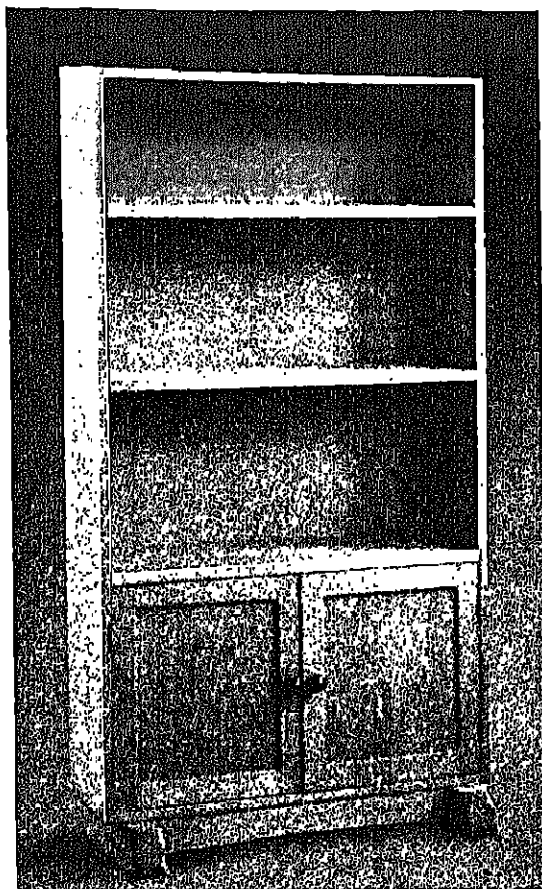


PLATE XXVI. BOOKCASE IN LIGHT OAK

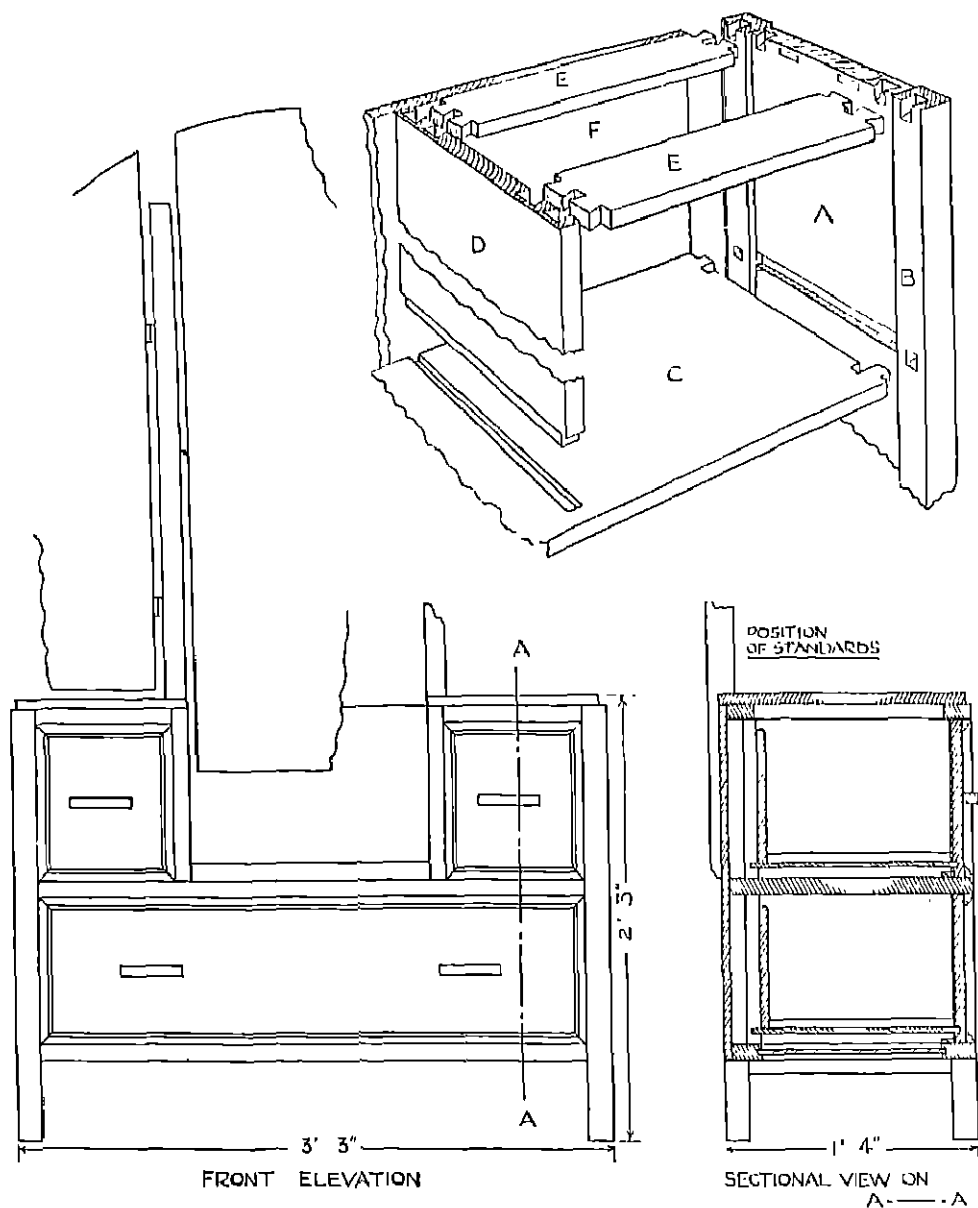


FIG. 30. DRESSING TABLE

A. Solid end doweled to leg. B. Front leg. C. Shelf. D. Inner side. E. Top rails. F. Back.

CHEST OF DRAWERS.—From previous descriptions and the detail diagrams (Plate XXVII and Figs. 31 and 31b), the construction of this job will be clear. Detail is given (Fig. 31b) of the framings at M and M on the sectional end elevation. The parts are as follows:

(A) The front drawer rail, double-tenoned to legs and notched round to fit up to the side panel; ploughed along inner edge for the dustboard.

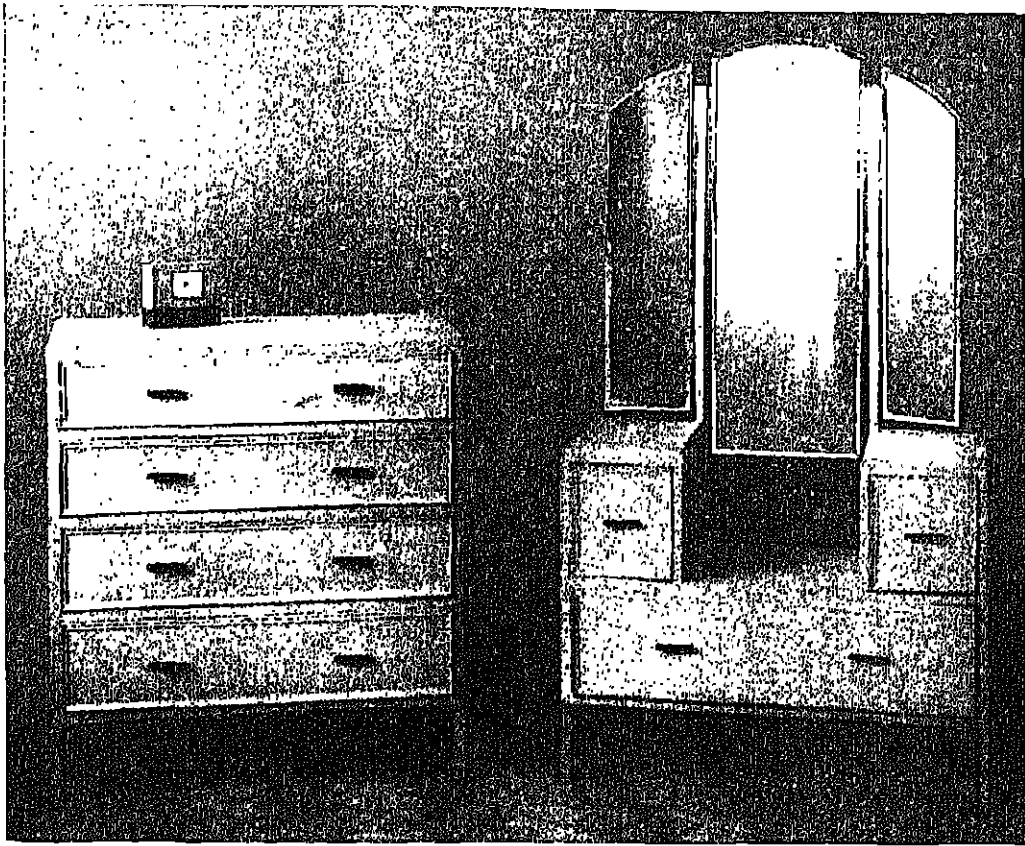


PLATE XXVII. CHEST OF DRAWERS IN LIGHT OAK, AND DRESSING TABLE IN LIGHT OAK

- (B) The leg into which the side panel is grooved.
- (C) The back rail tenoned to legs and set in from their outside face by the thickness of the back; ploughed for dustboard.
- (D) The drawer runner, fitted into front and back rails; ploughed for dustboard.
- (E) The drawer guide, fitted between legs and glued into place.
- (F) A side panel.
- (G) The plywood dustboard.

The rail at the centre of each end framing makes a drawer guide unnecessary if the rail is set in sufficiently to come flush with the inner face of the leg. The drawer runners act, in each case, as kickers for the next drawer beneath, but at the top a kicker should be securely screwed to the top rail of the end frame. The planted outer top can then be buttoned to this at the ends. Front and back can be screwed up through the top rails.

The finish is according to the timber used and is made to match the dressing table.

An alternative treatment to relieve the plainness of the drawer fronts is shown, a moulded bead being planted on round the edges of each drawer front and mitred at the corners. This is pinned and glued on, and to allow it to project a fraction from the framing edges the drawers are set in from them by the necessary amount to close at the right moment against the drawer stops.

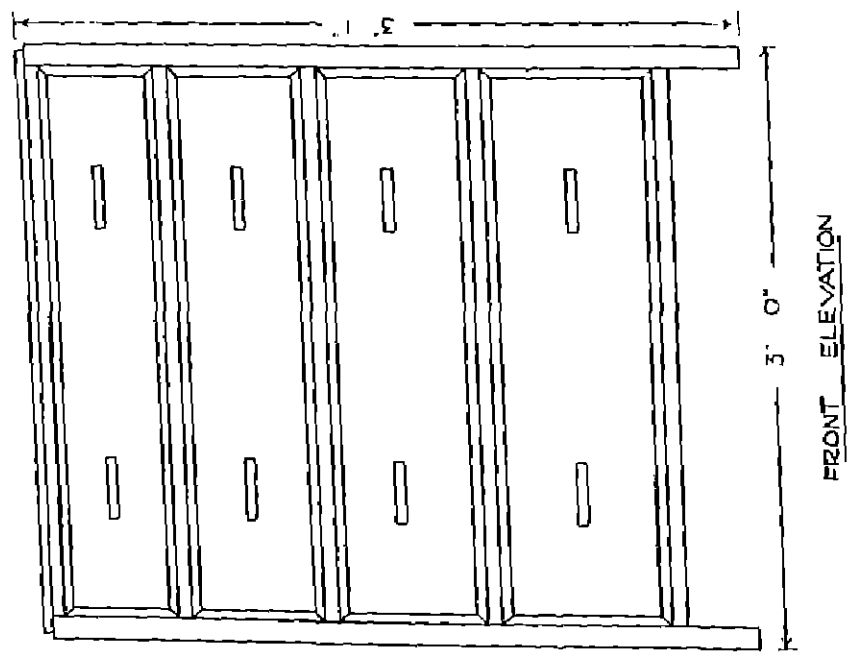
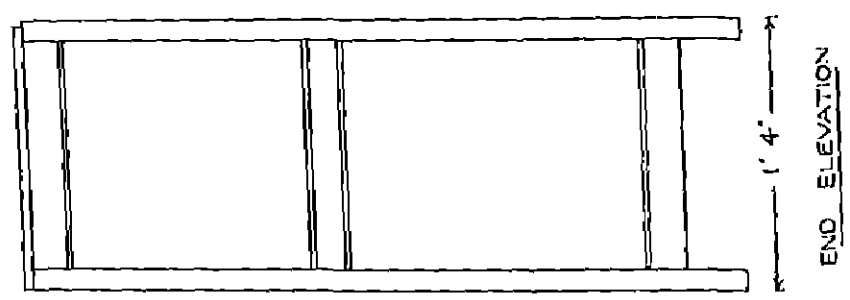
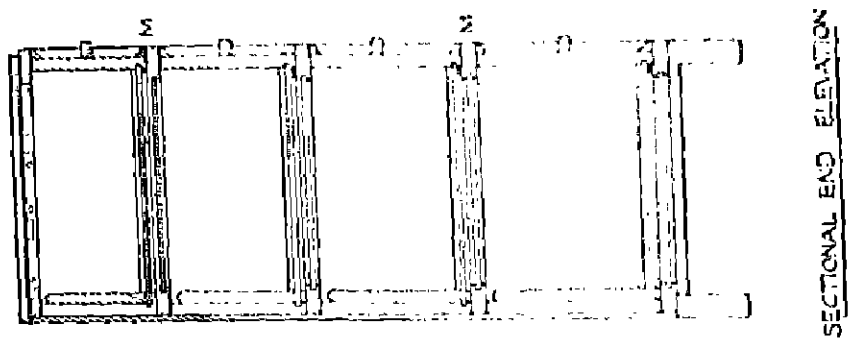


FIG. 31A. CHEST OF DRAWERS
M. and M. Sec FIG. 31B.

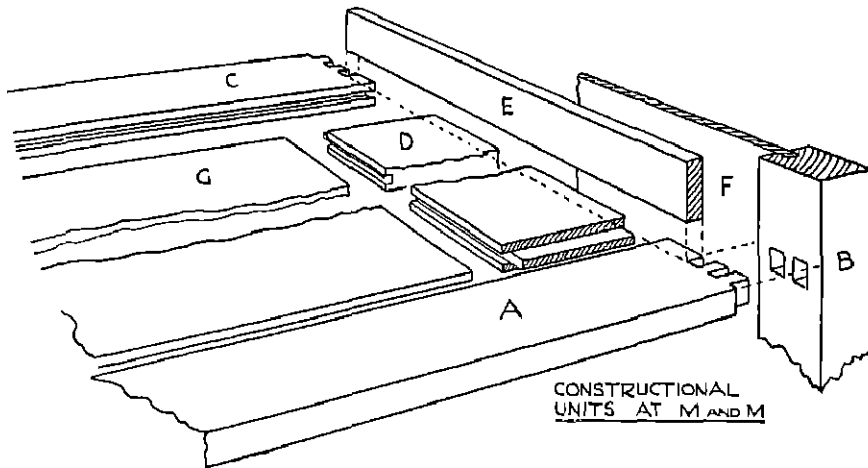


FIG. 31B. CHEST OF DRAWERS

A. Front drawer rail. B. Leg. C. Back rail. D. Drawer runner. E. Drawer guide. F. Side panel.
G. Plywood dustboard.

To avoid excessive cost and unnecessary weight, the framings carrying the drawers should all be made of clean deal or whitewood, the drawer rail itself being faced for about 1 in. at the front edge with oak, walnut, etc., with a strip rub-jointed on. Plain alder-faced plywood is quite good enough for the dustboards.

The drawers, however, should be made throughout of the hardwood.

SIDEBOARD.—This model done in light oak (Plate XXVIII and Fig. 32) in common with the last three examples illustrated, is an advanced piece of work such as may be begun at school and finished in the evening classes. The construction is not particularly difficult, as most of the work is but a repetition of what has already been done. The difficulty is

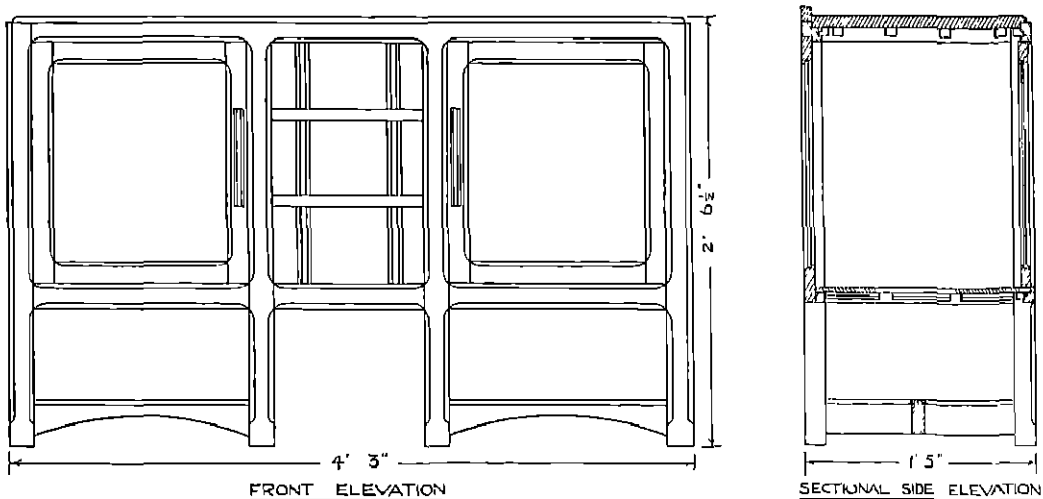


FIG. 32. SIDEBOARD IN LIGHT OAK

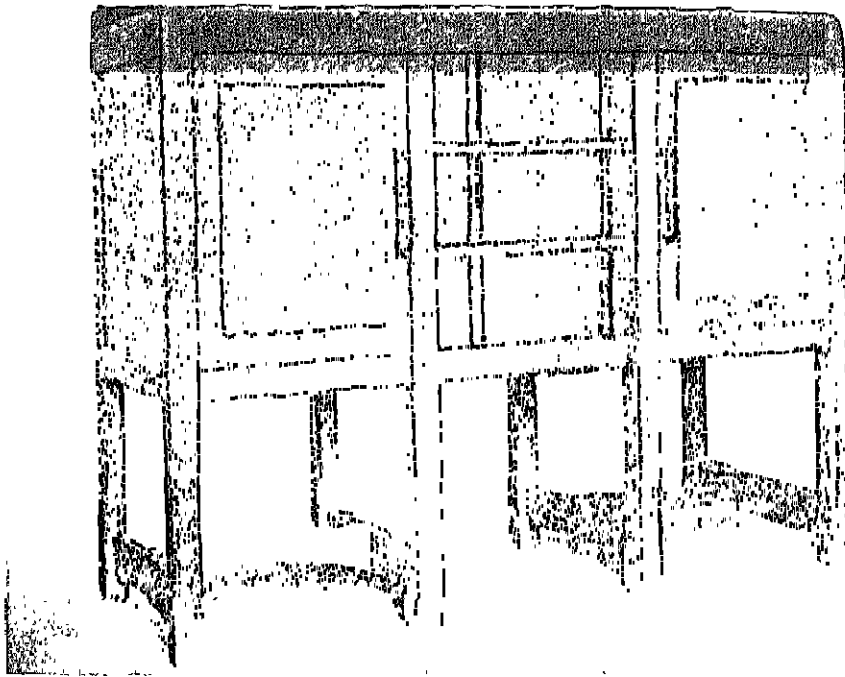


PLATE XXVIII. SIDEBOARD IN LIGHT OAK

experienced in gluing up the job and in getting it done in a reasonable time at a reasonable cost, but when finished it makes a fine piece of furniture well worth making.

The job is made with eight legs as this enables the two outside box framings to be made separately and partially glued up, thus doing away with much of the difficulty.

The front top rail is thus not tenoned in, but is dovetailed into the leg tops. This enables the rail to be placed down in position and glued at the same time that the centre rails are fitted.

The back is framed and panelled so that it extends in between the rebates right across the whole sideboard, and this necessitates the cutting away of the thickness of the back frame from the back faces of the two centre back legs, as far down as the back extends.

Cross rails join the front centre legs to the back legs, having a partition panel. Framings carry the drawers in the normal way.

Decoration is by the use of carriage chamfers, their carrying round the corners giving the effect of a boss at each junction of rail and leg. Drawer pulls are arranged vertically to give continuity of line in harmony with the construction lines.

The job is entirely oak, wax-polished.

SPECIMENS OF FURTHER WORK

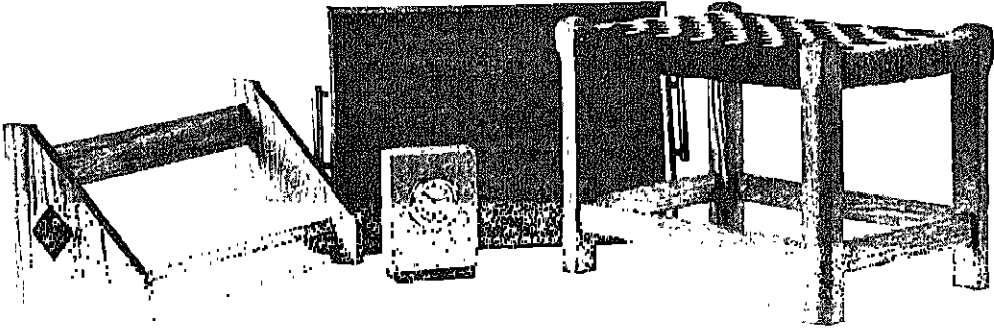


PLATE XXIX. BOOKRACK, DOVETAILED TRAY, CLOCK CASE, AND SEAGRASS STOOL

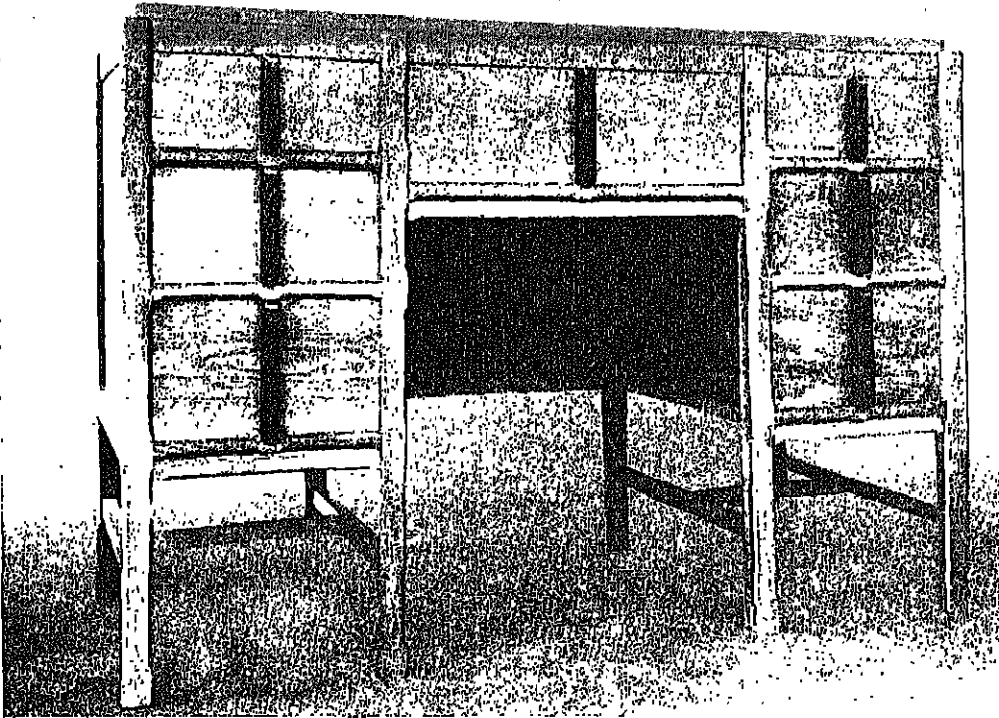


PLATE XXX. KNEE-HOLE WRITING TABLE IN LIGHT OAK WITH WALNUT PULLS

SPECIMENS OF FURTHER WORK.—The accompanying photographs on Plates XXIX, XXX and XXXI show a number of articles not included in the detailed diagrams, as their constructional features have been already dealt with in one or other of the drawings and descriptions.

The photographs include:

BOOK ENDS and BOOKRACKS (Plates XXIX and XXXI).

CLOCK CASES (Plates XXIX and XXXI).

KITCHEN CUPBOARD (Plate XXXI).

STOOL (Plate XXIX).

TRAY (Plate XXIX).

WRITING TABLE (Plate XXX).

The photograph at the beginning of the section on *Construction and Proportion* (page 371) shows a BOOKRACK, COFFEE TABLE and BEDSIDE CUPBOARD.

The photograph at the beginning of this section (page 401) shows a ROOM IN A SENIOR SCHOOL which has been furnished and decorated by the children's work, which includes in the illustration, woodwork, lino-block printing, bookbinding, weaving and rug making, block-printed curtains, lampshade and standard.

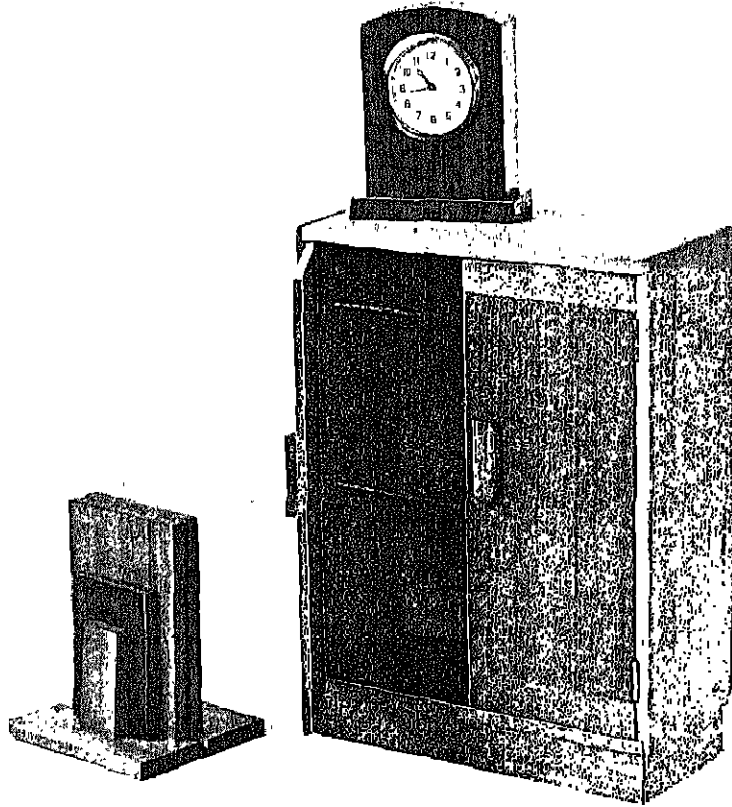
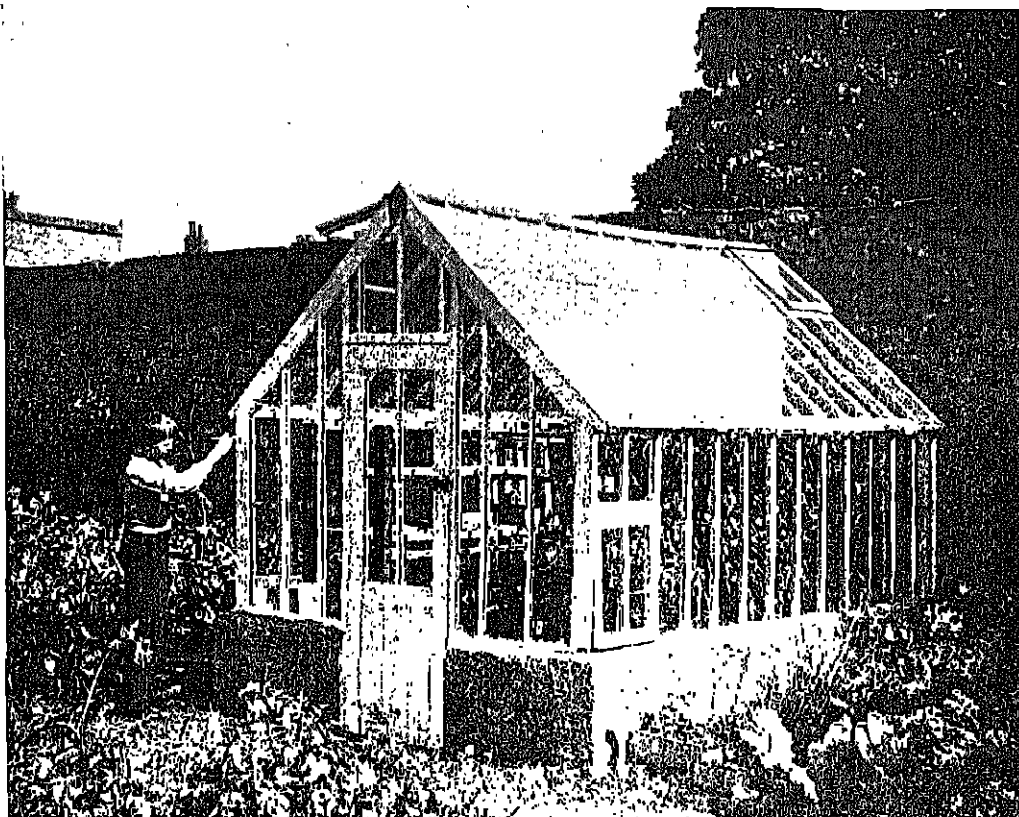


PLATE XXXI. BOOK ENDS, CLOCK CASE, AND KITCHEN CUPBOARD IN WHITEWOOD

OUTDOOR AND GENERAL COURSE



A SCHOOL GREENHOUSE BUILT BY THE BOYS
For details of construction see page 492.

THIS section of the school woodwork scheme is intended to supplement the *Fixed Course* and the *Individual* section, not to replace them. Thus it applies directly both to urban and rural senior schools having the facilities and the equipment for the teaching of both types of work, along with the gardens, grounds or other surroundings available for development.

It applies, also, to the pupils in "C" group already mentioned as finding the indoor formal course too difficult in its final stages. Many of the examples chosen in this section would be projects for group work and would appeal to this type of lad as being more within the bounds of his capabilities.

The smaller rural school, lacking in many of the facilities but possessing a certain amount of equipment, will be able to develop this section alone. For that reason the scope of the work suggested has been kept as wide as possible, although it is by no means fully comprehensive. It is intended, rather, to act as a general guide to this kind of work as distinct from the formal woodwork.

The difference between the courses.—It should not be assumed from the above remarks that any laxity as regards craftsmanship or finish may be allowed in the outdoor work. The type of job is different from that of the course on furniture making; the joints differ; the processes differ in many cases—cabinet scrapers are not needed, for instance—and a different size and type of timber is used. But the insistence on accurate *setting-out*, good workmanship and clean finish must be just as great. The craft of the carpenter and joiner is just as traditional and deserves as much respect as that of the cabinet-maker: it is concerned equally with everyday things which have to stand up to the wear and tear of normal use, under weather and other conditions that form a severe test of workmanship. Too much of this work is taken for granted nowadays, probably because it has been degraded by many jerry-builders and because it is not prettily veneered in sycamore or walnut. Another factor which has helped to lower its standing in the public eye has been the use of plywood, Beaver board, etc. Where speed and cheapness are important considerations these special boards are legitimate substitutes where properly used. They have supplanted much of the good hand workmanship which went into the building and fitting of shops, banks and public offices.

The same influence has been felt upon the purely gardening type of woodwork with which the school is largely concerned. Greenhouses are now mass-produced, also garages, tool sheds, kennels, poultry houses, etc. This practice has led in many cases to the cutting down to the absolute minimum both of strength and sound construction, although there is no fault to find with the better-class work in these respects. Unfortunately it has become a habit to say that "any old thing will do for this . . .," whereas there is no reason why any woodwork job should not be well done. In school this view is essential, otherwise it will be found that the slackness is reflected upon all the other work, of whatever kind it may be.

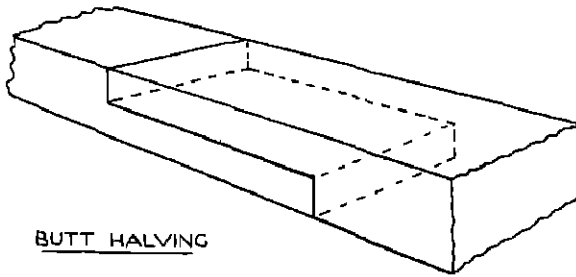
THE COMMON JOINTS

There are certain joints peculiar to the outdoor type of work, and others which are basically the same as those already dealt with but which differ in proportion and in the size of the timber used. For instance, many of the tenons which were sawn down with the tenon saw in the *Fixed Course* will now have to be sawn with the hand saw—a very different proposition. Mortises also, which would take too long and are too big to cut direct with the mortise chisel, are now bored out and then finished to size with the firmer chisel.

For these reasons the series of joints most likely to be needed are given here and also some which are seldom needed, but of which the class should have some knowledge. It is not necessary that all the joints shown should be made as exercises, as was done in the former courses, but only those which will be in common use.

Probably the greatest factor that has to be considered in the making of these joints, and the selection and use of the timber for them, is the avoidance of their weakening owing to normal shrinkage of the wood. Thoroughly seasoned softwoods at reasonable prices are almost unobtainable at the present day, and possible shrinkage will often determine the type and proportions of the joints to be used in a job. This is due to the larger sizes and the softness of the timber most suitable for the purpose in hand, and when it is considered that a well-fitting tenon may become comparatively loose in six months or less, it will be obvious why the practice of draw-pinning such joints in larger stuff is so common.

Again, much of the work is nailed, screwed, bolted and/or painted, but this does not provide any excuse for careless workmanship.



BUTT HALVING

FIG. 1

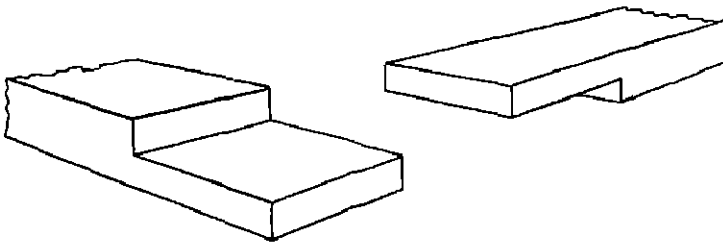
Red or yellow deal is used throughout and is quite satisfactory for most purposes. Oak, elm and ash may be needed for specific jobs or as members of otherwise softwood jobs, but only in small quantities. When necessary these, and also larch poles for screens, etc., are best obtained from a local estate agent, if possible, or a country builder's yard where all kinds of work are undertaken, as it will be found

difficult to obtain small quantities from the central contractor.

HALVING JOINTS

BUTT HALVING.—Used for extending the length of a member while retaining a flush surface, as in the case of a wall plate, rail or ridgepiece, Fig. 1. The joint should always occur at the top of a post or stud so that it receives support from underneath, or on a wall, or other supporting rail.

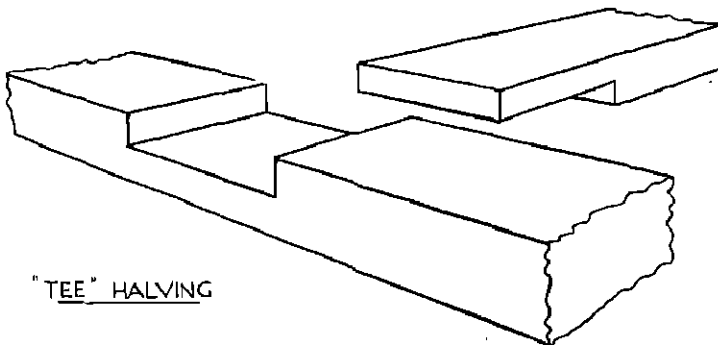
It is secured by either nailing, screwing, bolting, or by wooden pegs.



CORNER HALVING

FIG. 2

CORNER HALVING.—The commonest joint connecting timbers at a right-angled corner, as in the case of the wall plate of a fixed structure. Usually nailed direct on to the top of the post, Fig. 2. It may be used for rough frames, when it is doweled with wooden pegs instead of being nailed.



"TEE" HALVING

FIG. 3

"TEE" HALVING.—A common joint for cross-members acting as struts for the purpose of holding other members parallel, Fig. 3. It is not suitable for any case where an outward pull or thrust is exerted. Again, it requires underneath support owing to weakening of the lower member.

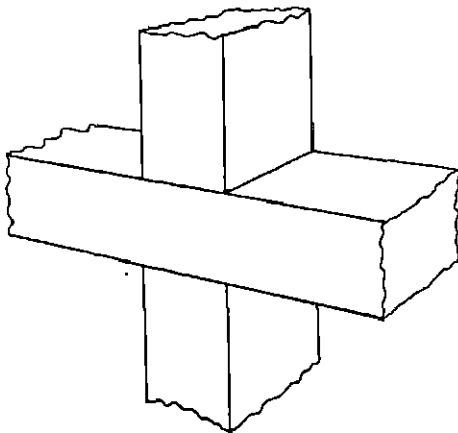
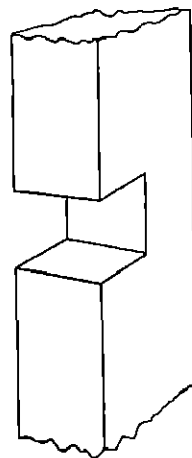
CROSS HALVING

FIG. 4



CROSS HALVING.
—Used for two members crossing at any angle—at or approaching the right angle—but which have to be kept in the same plane, Fig. 4. It is most suitable for vertically placed members such as rails or sills crossing braces or studs. It may be used for horizontal framings where the weight is not heavy, and when not subjected to sudden shocks.

TAILED HALVING.—Used as an occasional alternative to the plain cross halving to give additional assurance of rigidity—also in case of probable shrinkage causing side play, Fig. 5.

The dotted line in the diagram shows the second alternative by which both shoulders are dovetailed, but this is usually not necessary.

HOUSED JOINTS

PLAIN HOUSING.—The whole of the end of one member is let in to the thickness of the other. Sills and rails may be jointed to upright members in this way, Fig. 6a.

"Notched."—When one member is housed into a wider member than itself, so that the groove in the latter is "stopped," the joint is often known as a "notched" joint, Fig. 6b. This occurs, for instance, at the joint between the ends of ceiling joists and their supporting beams.

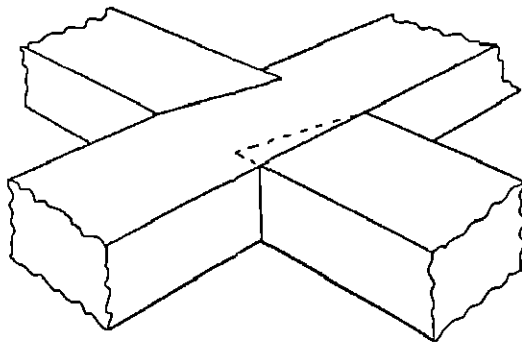
CROSS DOVETAILED HALVING

FIG. 5

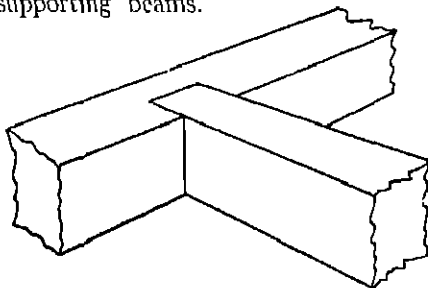
PLAIN HOUSING

FIG. 6a

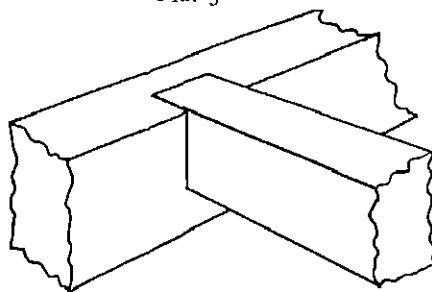
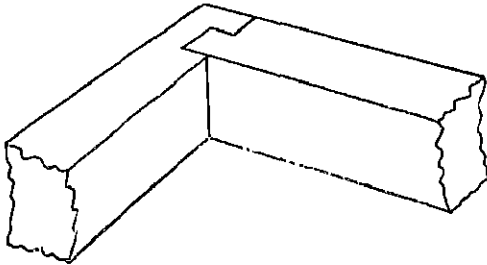
"NOTCHED"

FIG. 6b

TONGUED JOINT.—This term is usually applied to the variety of housing joint in which the two members meet at a corner, one of them being shouldered as shown in the diagram, Fig. 7. It is used for light framings where both members are securely held by other means in addition, and where there is no sideways stress.

DOVETAILED, HOUSED OR "TRENCHED" JOINTS.—Common to both cabinet work and light framings, but not very common, or ordinarily necessary, in outdoor work, Fig. 8. Housing joints are used extensively in staircase work, but this is beyond the scope of the course.



TONGUED JOINT

FIG. 7

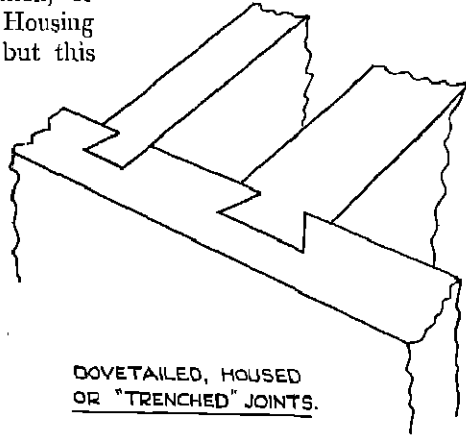
DOVETAILED, HOUSED
OR "TRENCHED" JOINTS.

FIG. 8

REBATED AND HOUSED OR "TONGUED AND HOUSED" JOINT.—The shoulder across the end of the tongued member assists in obtaining rigidity and in holding this member firmly at right angles to the other one, Fig. 9.

REBATED JOINTS

REBATED ANGLE JOINT.—Suitable for light and rough work, such as moulds for light concrete paving blocks, or for window boxes in wider stuff where a flush outer surface is necessary for fitting in a recess, Fig. 10. Whilst not a very strong joint, the shoulder prevents leakage due to poor fitting such as might occur in the butt joint, and does add considerably to the strength.

The joint becomes quite sound for many purposes if the inside faces of the wood are given two coats of paint to render the joint watertight and to give a protective finish.

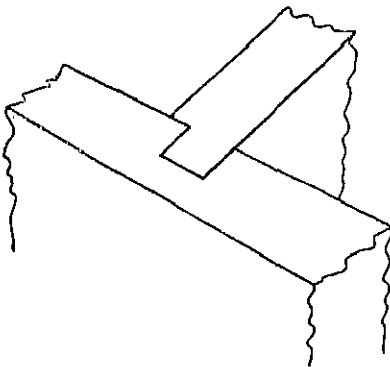
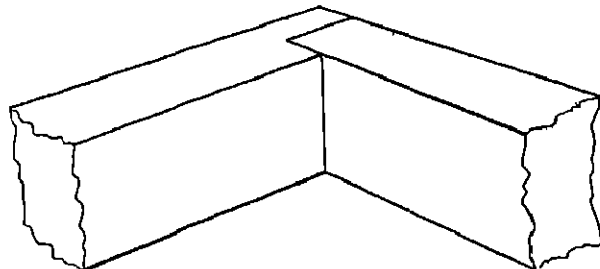
REBATED AND HOUSED
OR "TONGUED AND HOUSED"
JOINT.

FIG. 9



REBATED

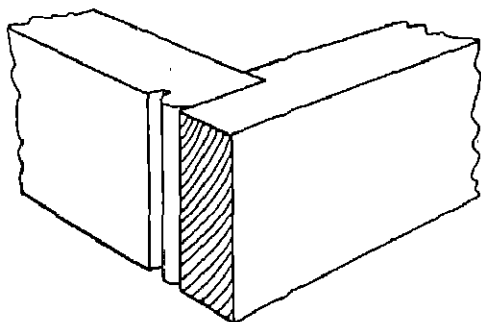
FIG. 10

REBATED AND BEADED JOINT.—Used where a good fit is difficult or impossible to make, and where the members have to be assembled separately in position, Fig. 11. Only used, however, where the prominence of the end grain does not matter.

REBATED AND RETURN-BEADED JOINT.—Used as above, but where it is necessary to disguise or cover the end grain. Certain types of large work on such fittings as folding doors and linings necessitate the use of this variety of rebated joint, Fig. 12.

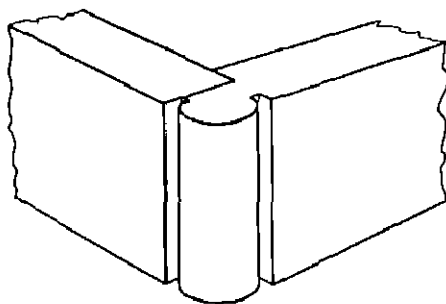
The purpose of the bead in both types is twofold:

1. For decorative appearance.
2. To cover or disguise the effect of shrinkage of the members away from the "dry" or open abutting joint.



**REBATED AND
BEADED**

FIG. 11

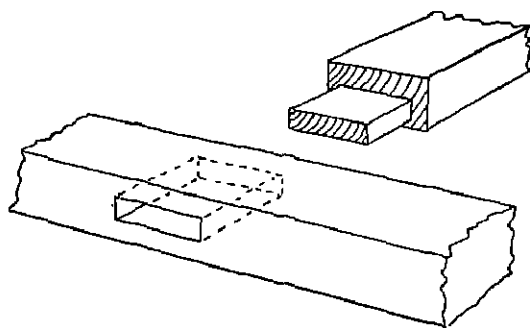


**REBATED AND
RETURN-BEADED**

FIG. 12

MORTISE AND TENON JOINTS

"THROUGH" MORTISE AND TENON JOINT, SHOULDERED.—Used in the framing-up of doors and other structures, Fig. 13. Probably it is the commonest joint to be employed in the outdoor woodwork course. (The detailed method of construction of this and other joints has already been given in the *Fixed Course*.)



**"THROUGH" MORTISE AND
TENON JOINT SHOULDERED**

FIG. 13

"STOPPED" MORTISE AND TENON JOINT, SHOULDERED.—Although more commonly employed in furniture making, this joint may be used extensively in general work, and especially for apparatus making, such as stands for looms, Fig. 14. Whereas the through tenon is invariably wedged from the outside, this joint is left without wedges in light stuff. In heavy stuff, or where a strong joint is needed, it is undesirable to take the tenon right through, the mortise ends are cut slightly sloping outwards and thin wedges

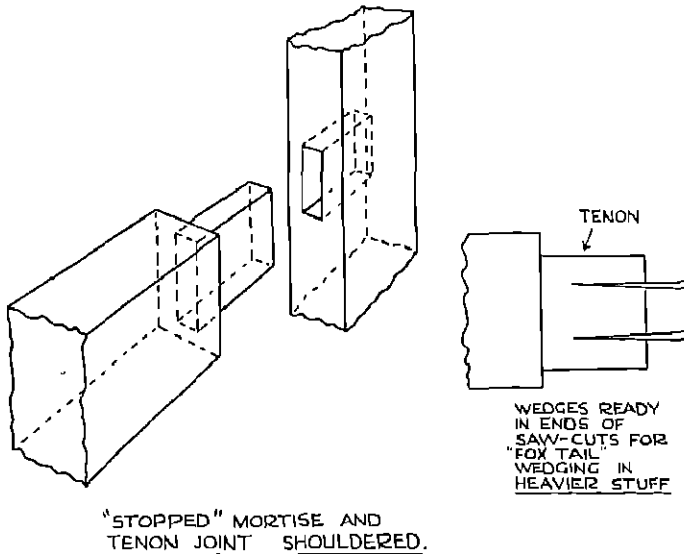


FIG. 14

are carefully inserted into the ends of saw cuts made down the tenon. When the joint is driven home these are forced into the cuts, spreading the tenon and effectively locking the joint.

This type of wedging needs great care, as should the wedges be too long they will project from the tenon end and "ride" on the bottom of the mortise, thus preventing the joint shoulders from fitting up properly. The mistake cannot then be remedied.

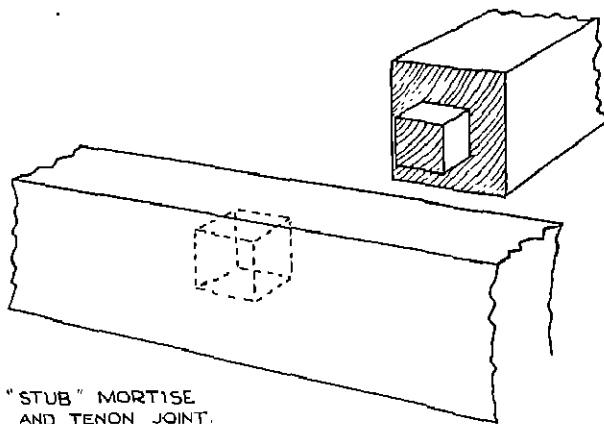


FIG. 15

"STUB" MORTISE AND TENON OR "JOGGLE" JOINT.—

A common variety of mortise and tenon in building construction where a wooden member has to be joined to one of stone, etc., Fig. 15. It is used more for the purpose of keeping the former in position

rather than as a method of secure joining. It is also used for heavier roof framings.

"BARE-FACED" MORTISE AND TENON JOINT.—So called because it is shouldered only on one side, as shown in the diagram, Fig. 16. Used when it is required to place the tenon member out of centre on the leg or post to which it is joined, and when an extra strong tenon thickness is desired.

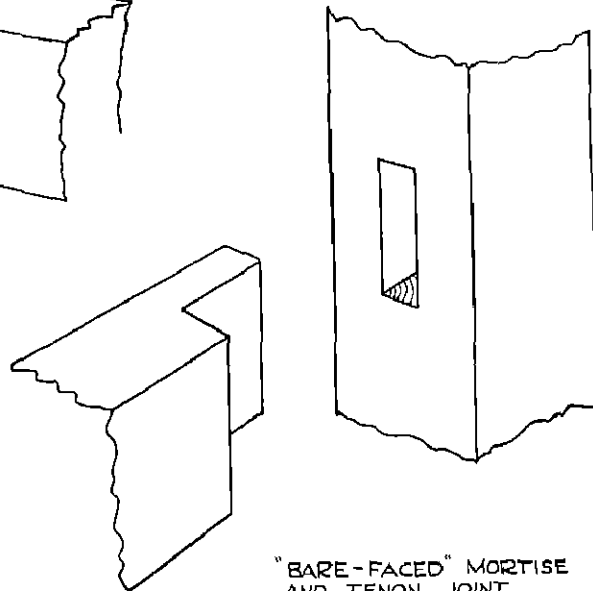


FIG. 16

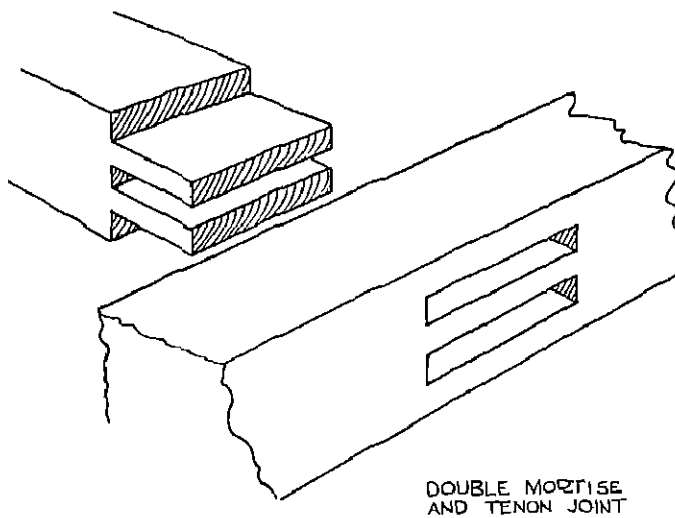
DOUBLE MORTISE
AND TENON JOINT

FIG. 17

DOUBLE MORTISE AND TENON JOINT.—In large and thick stuff used for heavier work a single tenon would necessitate a mortise so large that the mortise member would be seriously weakened at one point. To avoid this, two separate mortises are used with a double tenon, as shown in Fig. 17. In any case, this forms a much stronger joint than would be made by the single tenon alone.

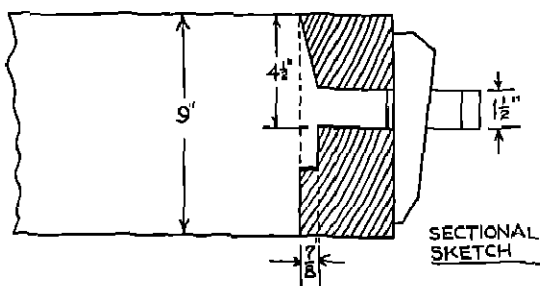
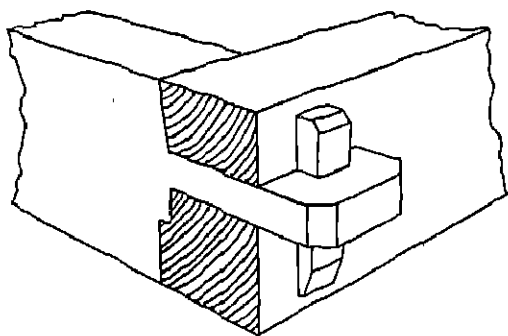
"TUSK TENON"
MORTISE AND TENON JOINT.

FIG. 18

"TUSK TENON" MORTISE AND TENON JOINT.—A joint much used in flooring and roof work, arranged to avoid weakening of the members by the inclusion of the "tusk" at the shoulder line, Fig. 18. It is really a combination of the notched joint and the ordinary tenon, and the tusk provides a strong bearing surface to resist any tendency towards shearing of the tenon.

The tenon is usually made one-sixth of the width of the stuff in thickness, being brought well through and wedged as shown.

It is unlikely that this joint will be needed in school work, unless fairly heavy flooring is undertaken, but the boys should know something of it and should take any opportunity that might occur locally of studying its actual use in building.

"CHASE" MORTISE AND TENON JOINT.—This joint is employed when it is necessary to put in a fresh member jointed to other members already in position, so that it is impossible to use the normal tenoning method, Fig. 19. The mortises will, of course, "lead in" in opposite directions on each opposite member.

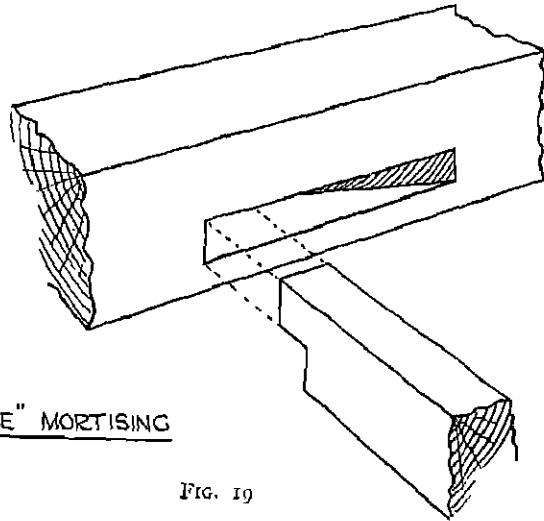


FIG. 19

BRIDLE JOINTS

"TEE" BRIDLE JOINT.—A good joint for all kinds of light framings, though not easier to make than the mortise and tenon joint, Fig. 20. It may be used for members which meet at an angle other than the right angle.

To hold this joint securely, it is customary to insert a wooden pin or dowel, which may be round or square in section. This pin is put in in such a manner that it pulls the shoulders of the joint up tightly as it is driven home, and this pull is ensured by boring the hole in the middle section of the joint a fraction nearer the shoulder than the holes in the outer sections. The method is known as "draw-boring," and is shown in the diagrams.

"ANGLE" BRIDLE JOINT.—This joint is not at all easy to make, as it requires very accurate sawing to obtain a good fit without the jaws of the "bridle" member being forced open at the outside edge, Fig. 21.

The joint is used for similar purposes to those mentioned above, for which the "Tee" bridle joint is suitable, including all kinds of flat framings which are not subjected to great stress in use.

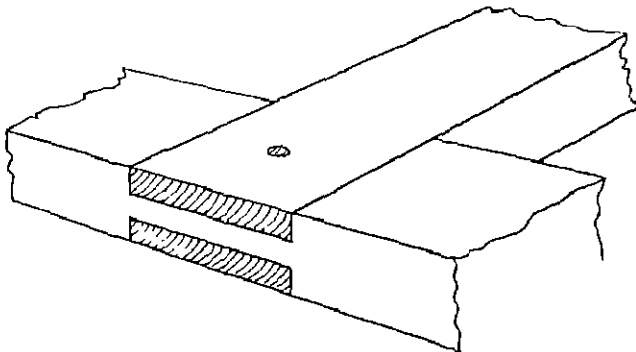
"TEE" BRIDLE JOINT

FIG. 20

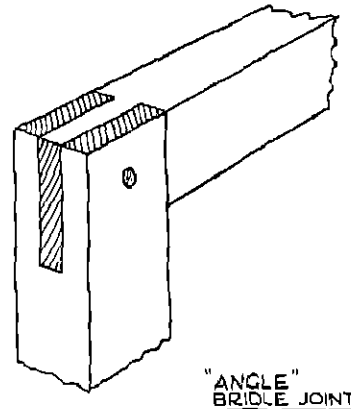
"ANGLE" BRIDLE JOINTSECTIONAL VIEW SHOWING
USE OF DRAW-BORING

FIG. 21

DOVETAIL JOINTS

Several of these have been dealt with in the other parts of the course, but they are mentioned here as they form an important part of the whole group of joints which is based upon the dovetail.

They are:

1. THE "THROUGH" DOVETAIL JOINT.
2. THE "LAPPED" DOVETAIL JOINT.
3. THE STOPPED OR SECRET "LAPPED" DOVETAIL JOINT, which is shown in the stages of marking-out and cutting, Fig. 22.

The diagrams show the necessity for marking and cutting the pin piece (P) before transferring the marking to the dovetail piece (D), the latter having been gauged and stepped across the end in readiness for this marking.

Should it be intended to bring the outside surfaces of the joint flush, the step or overhang (B) will be equal to the thickness (A) of the socket walls, and this must be provided for by the gauging in the first stage. The customary finish is shown at C and E, below, in which the step (B) is reduced in width to give a pleasanter finish to the top edges.

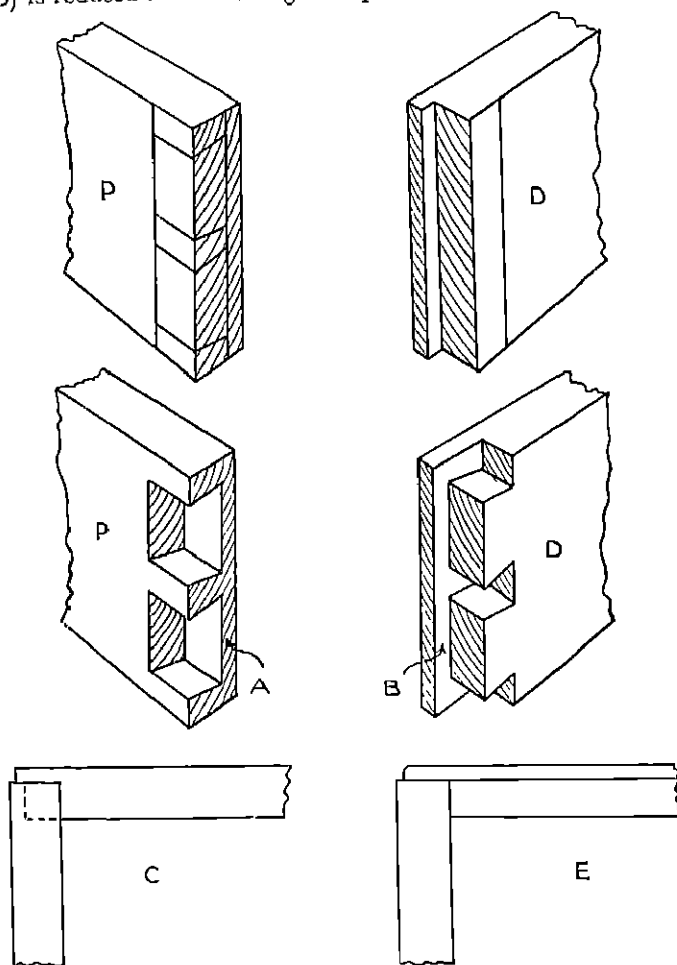
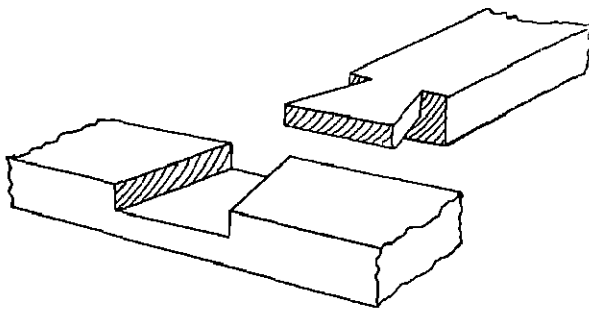


FIG. 22. DOVETAIL JOINTS

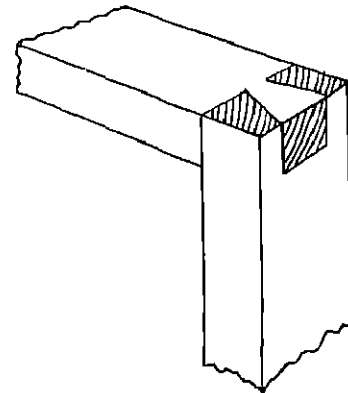
DOVETAIL HALVING JOINT.—This is a strong joint for flush-faced framings, and is not affected by shrinkage to the same extent as the ordinary "Tee" halving joint. It may be used for ties, at various angles with connecting members, and in positions where tensional stress is exerted, Fig. 23.

ANGLE-DOVETAIL JOINT.—The strongest joint for corner framing, where the face of the stuff meets the joint instead of the edge, Fig. 24. A useful joint for the corners of side frames in portable buildings.



DOVETAIL-HALVING
JOINT

FIG. 23



ANGLE-DOVETAIL JOINT.

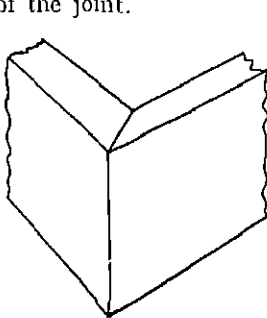
FIG. 24

MITRED JOINTS

BUTT MITRED JOINT.—The simplest form of mitred joint, but suitable only for temporary rough work of a light nature, Fig. 25. It is secured by nailing. Glue blocks should be fitted inside the corner, if possible, to give more strength. Examples of its use are shown in Figs. 25, 26 and 29.

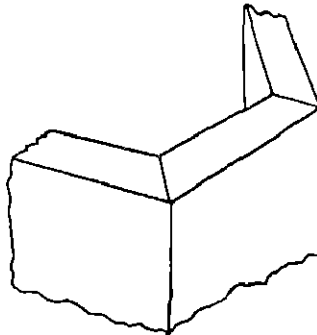
CROSS-TONGUED MITRED JOINT.—In this case, two narrow grooves are cut at right angles to the face of the mitre, one on each piece, and for a depth of $\frac{1}{4}$ in. in light stuff, Fig. 27. A "key" of cross tongue is then prepared which is cut across the grain of the wood, and which is trimmed until it is a hand-tight fit in the grooves. The joint is secured by gluing the cross tongue into place, and cramping up.

This is a strong joint, suitable for plinth bases when reinforced by glue blocks in the angle of the joint.



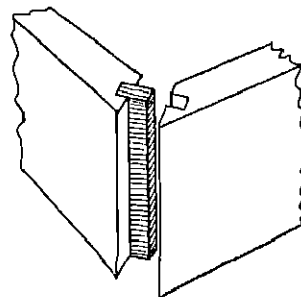
BUTT MITRED
JOINT

FIG. 25



MITRED BUTT
JOINTS

FIG. 26



CROSS-TONGUED
MITRED JOINT

FIG. 27

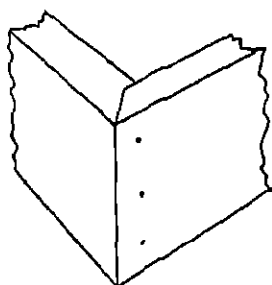
SHOULDERED AND
MITRED BUTT JOINTS

FIG. 28

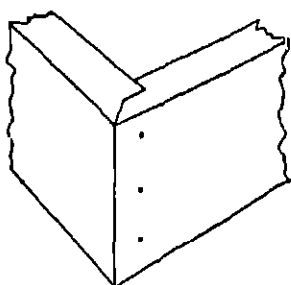
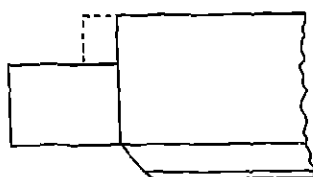


FIG. 29

SHOULDERED AND MITRED BUTT JOINTS.—Two forms of the joint are shown, both of which require to be secured by nailing, and to be strengthened by glue blocks if possible, Figs. 28 and 29.

MORTISE AND TENON JOINT WITH MITRED SHOULDER BEAD.—When it is not desirable that the moulded edge of the

stile should be carried right through and the rail shoulder scribed over it, this form of mitred joint may be used, Fig. 30. The moulded edge on the stile is cleaned off flush with the rebate, and mitred back to meet the end of the moulding on the rail. The tenon may be haunched, as shown by the dotted line in the diagram.



MITRED SHOULDER

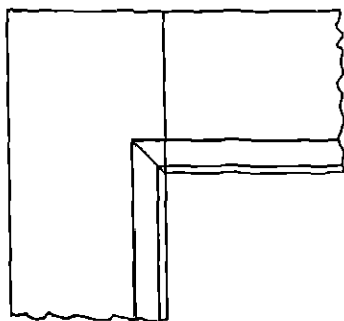


FIG. 30

MORTISE AND TENON JOINT WITH "MASON'S" MITRE.—To enable the full width of the stuff to be retained at the joint, and to avoid the scribing of the rail shoulder, the moulding may be stopped and mitred in the solid, as shown in Fig. 31. The objection to this method is that the moulding cannot be cut with a plane on a short length, so

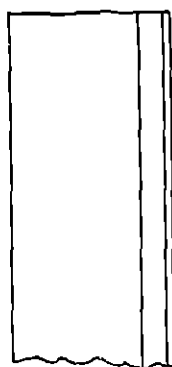
that a scratch stock has to be used, and the mitres have to be finished by hand on the stiles.

MORTISE AND TENON JOINT WITH "SCRIBED" SHOULDER.—This form of joint is shown here for comparison with the two methods given above, Fig. 32. It is a difficult joint for boys to attempt, but it is used very largely—in various forms—in the jointing of window frames and sashes.

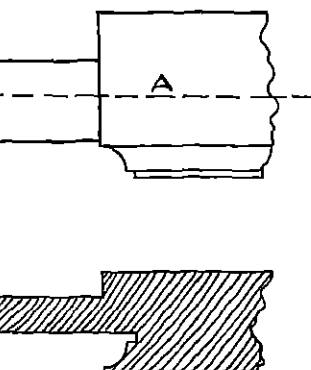


"MASON'S" MITRE

FIG. 31



"SCRIBED" JOINT



SECTION THROUGH A

FIG. 32

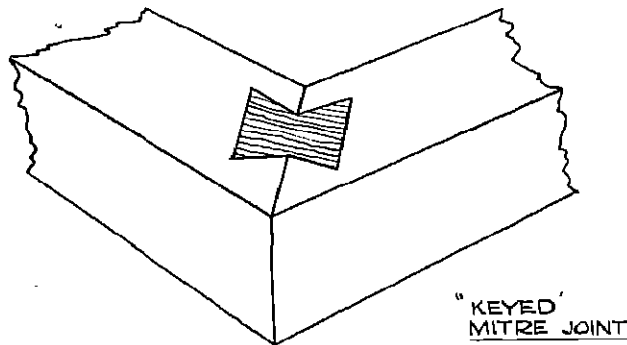


FIG. 33

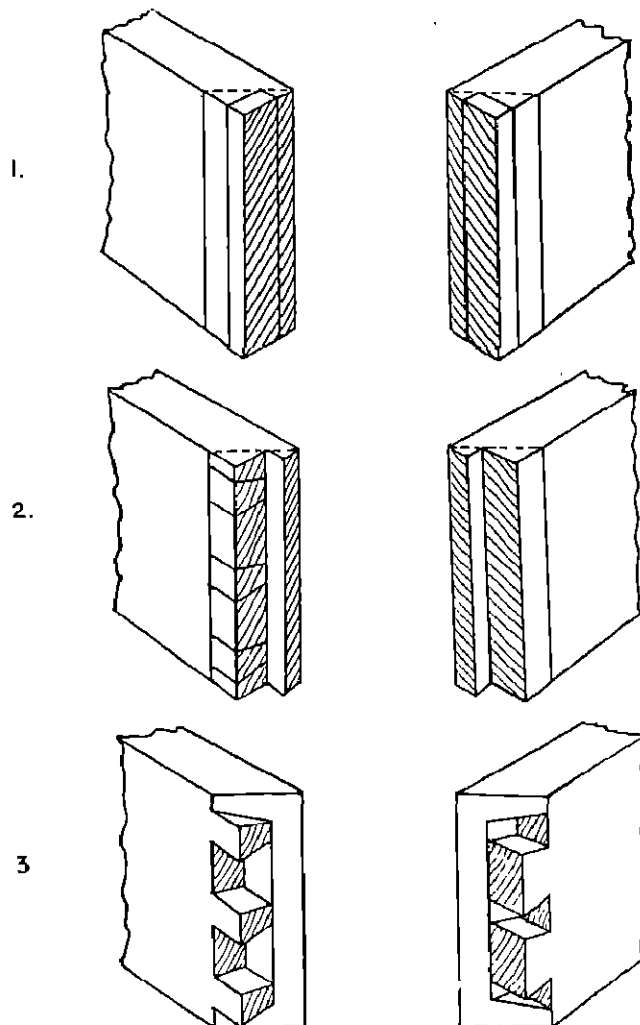
"KEYED" MITRE
 .—A very strong joint
 ht or heavy stuff at
 any angle, Fig. 33.
 ey varies in thickness
 ng to the size of the
 embers to be mitred,
 ay be repeated on the
 e face. It should be
 of hardwood. The
 corners of wooden kerbs
 ured in this way.

SECRET MITRED DOVE-
JOINT.—This is the
 est joint which can be
 to give a mitred edge
 with a plane, unbroken
 : on each face of the
 ight up to the corner,
 t.

diagrams show the
 s in marking-out and
 g the joint.

ommon instance of its
 the upper carcase joint
 side of a writing bureau,
 ich there is no moulded
 ge.

s the best joint to use in
 oundwork for veneering,
 ere is no end grain left
 veneered over, and the
 surfaces that it gives are
 le for French polishing.



SECRET MITRED DOVETAIL JOINT

FIG. 34

DOWELLED JOINTS

CORNER BUTT JOINT.—This is a quick and easy method of joining two pieces of fairly thin stuff, in a position where a secret joint is desired, Fig. 35. An example of its use is given in the side frames of the lounge chair included in the *Individual Course*, see Index.

When a carcase is framed up with solid sides and legs, or posts, these are frequently joined together by short dowels at intervals of about 6 in., and the strength of this type of joint is very surprising.

DOWELLED MITRE JOINT.—The mitre joint shown is strong, and is very useful for picture and other frames in light stuff, Fig. 36.

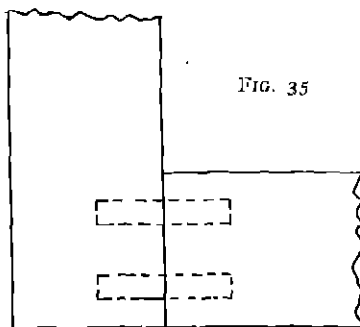


FIG. 35

CORNER BUTT JOINT

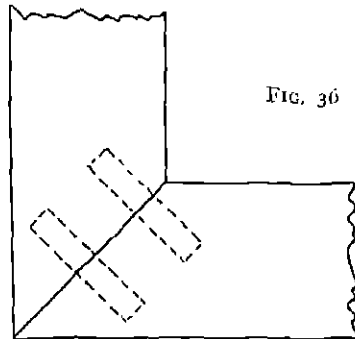
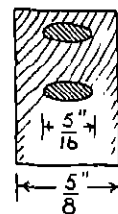


FIG. 36

DOWELLED MITRE JOINT



DOWELLED SEGMENTS—MITRED.—The diagrams (Figs. 37 and 38) illustrate a strong method by which a series of segments may be joined together, and, later, may be trimmed

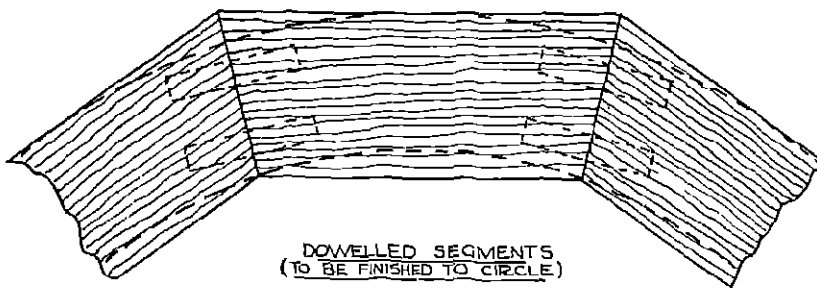
DOWELLED SEGMENTS
(TO BE FINISHED TO CIRCLE)

FIG. 37

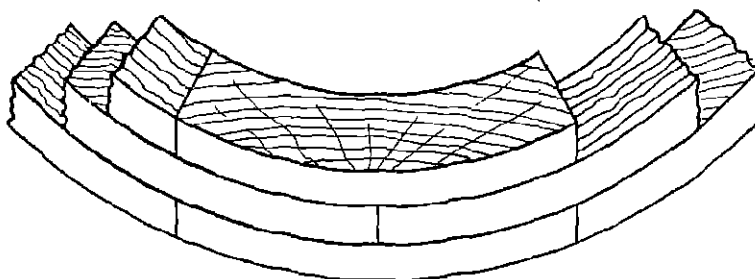
LAMINATED SEGMENTS,
FOR HEAVIER WORK

FIG. 38

to a circle for use, as for the edging of a table, etc. Should greater strength be required, the rim should be built up as shown in the second diagram, the various thicknesses being press-glued together. They may be dowelled as well.

DOWELLED SPLICE JOINT.—

This joint will seldom be needed, but it is useful in any position in which it is necessary to avoid the use of nails or screws, Fig. 39. It is considerably stronger than the plain butt joint, but should not be used in an unsupported position on a long, horizontal member.

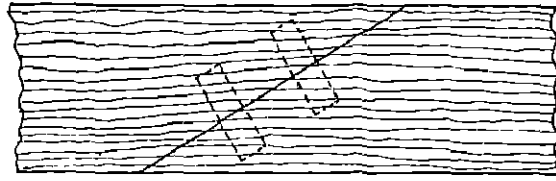
DOWELLED SPLICE JOINT

FIG. 39

RUBBED OR GLUED JOINTS

RUB JOINTING.—The diagram (Fig. 40A) shows the method of butt gluing several pieces of stuff, edge to edge, to obtain a wide surface. This is known as "rub jointing," as the edges of both adjacent lengths are glued and then rubbed together until the glue begins to thicken. When it is no longer possible to move one piece on the other, the joint is laid aside to dry.

This joint is extremely strong if properly made, and its success depends upon the exact fitting and squareness of the two edges forming the joint. When this fit is obtained, and the edges are glued and rubbed together, all the air is expelled from the joint along with the

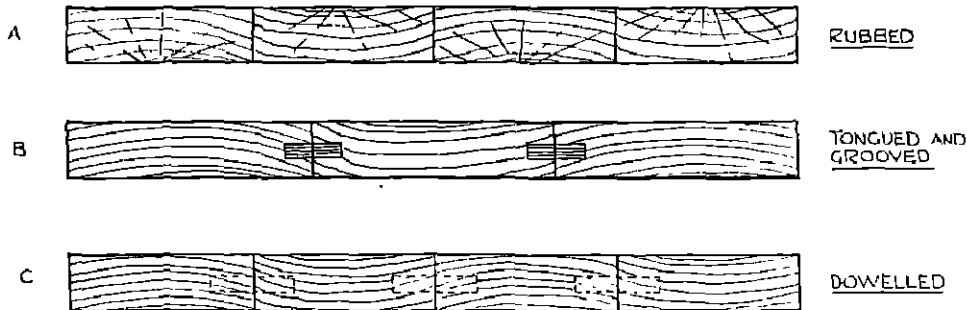
RUBBED OR GLUED JOINTS

FIG. 40

surplus glue, and the suction between the two surfaces gives extra strength to the large number of small glue dowels which are formed by the rubbing of the glue into the pores of the wood.

Care must be taken to see that the joint is not broken during the rubbing process by lifting one edge of the upper piece. Should this happen, it will be necessary to wash off all the glue left on both edges, and to reglue them and rub them afresh.

It will be seen from the diagram that to avoid "casting" or warping of the whole width of rubbed pieces, it is advisable before jointing to turn the alternate pieces over so that the heartwood side of one length comes next to the sapwood side of its adjacent member.

TONGUED AND GROOVED JOINT.—The same method of gluing applies to the tongued and grooved joint shown at Fig. 40B, but it is customary to cramp up this joint and to leave it in the sash cramps until it is dry.

Table tops which have to be made in thick stuff, and which have to be fixed firmly in position, are jointed in this way, so that should one or more of the joints be "sprung" or opened by shrinkage of the parts of the top, the tongues will help to prevent water, etc., from getting into the cupboards or drawers underneath. This point becomes important in the case of tables of the kitchen type, which are used for cooking or laundry work and which need to be washed down at intervals. For these purposes, the top should be made of deal or sycamore, and should be left unstained and unpolished.

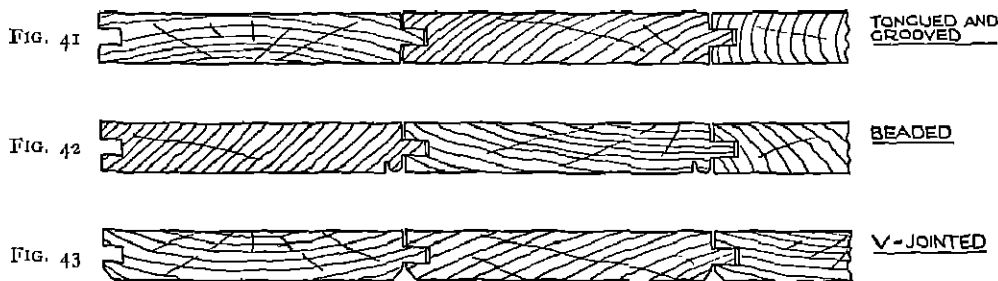
DOWELLED JOINT.—This joint is much weaker than either of the two edge joints, mentioned above. It is shown at Fig. 40C. The joint cannot be rubbed, so that reliance must be placed upon getting a good fit between the two edges, and upon careful cramping up after gluing. It is very important that care should be taken over the cramping up, as there is a danger of the whole width being buckled by the over-tightening of the cramps. This causes the centre part to bow upwards from the cramp bar, and breaks the joint on the outside edges. When this happens, the only remedy is to saw right down the joint through the dowels, and to refit the whole joint.

ADDITIONAL JOINTS NEEDED FOR OUTDOOR WOODWORK

MATCHING JOINTS.—Matchboarding is used for wainscoting, the lining of wooden framings, and similar covering work, Figs. 41, 42 and 43. If any considerable quantity is needed it may be bought cheaply, already tongued and grooved, but if only a short length is wanted in a hurry, it may be worked by hand.

The diagrams show three methods of finishing match-boarding, the tongued and grooved joint being used in each case. The first diagram (Fig. 41) is of the joint alone, the shoulders being butted square and showing nothing on the outer surface beyond the joint line. Should any shrinkage take place, an ugly gap would show along the length of the join. To avoid this, one of the abutting edges is beaded as in Fig. 42, or both are chamfered as in Fig. 43.

The chamfered edge, known as V-jointed matching, disguises the joint line and any subsequent shrinking, and is the best method to adopt.

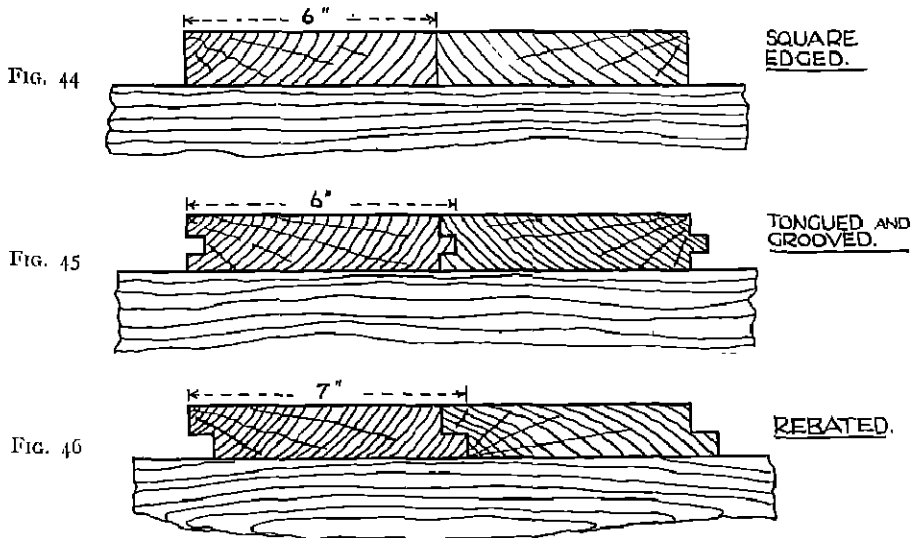


SECTIONS OF MATCH-BOARDING

ADDITIONAL JOINTS NEEDED FOR OUTDOOR WOODWORK—MATCHING

FLOOR BOARD OR BATTEN JOINTS.—Three types are shown, of which the first is most commonly used. The drawback to the use of the square-edged butt joint (Fig. 44) is that shrinkage of the wood always opens the joints, allowing draughts and dust to come through.

If the battens are tongued and grooved, as in Fig. 45, the joints remain sealed against damp air and dust, even though shrinkage does take place, and the flooring is kept level



FLOOR BOARD OR BATTEN JOINTS

by the tongues as well as by the nails. This method is the commonest for all but the cheapest work.

The rebated battens (Fig. 46) have the same advantages as the tongued and grooved variety, but, being 1 in. wider in standard size, and more expensive, they are not so commonly used.

Other and more elaborate methods are used for work of good standard, and these include the use of fillets, or of skew-nailing through a splayed tongue. As these methods are not likely to be needed in the school work they are not given here in detail.

Fig. 47 shows the type of nail used for fixing floor boards. It is a cut nail, known as a "brad," and has a small head which holds very firmly without making a large hole in the board.

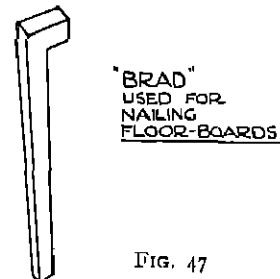


FIG. 47

ROOF JOINTS

At the present day, many schools are making their own tool sheds, garden huts, pavilions, etc. The following diagrams and descriptions are concerned with the simple joints and constructions which may be needed, and which are standard details for all work of this type.

Only those suggestions which can be carried out in school workshops or gardens have been included here, but they may form a basis for a much greater variety of useful projects.

BIRD'S MOUTH JOINT.—This joint is used in buildings of all types and sizes where the common rafters, carrying the roof, meet the wall plate.

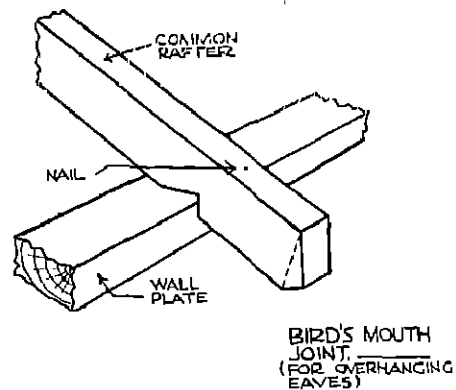


FIG. 48

Fig. 48 shows the form it takes when the roof is required to overhang the walls, as is customary in the case of a span, or double-sided roof with a centre ridgepiece. The portion to be cut from the common rafter is best marked out from a template which has been adjusted to the pitch, or slope, of the roof. The joint is secured by nailing through the rafter into the wall plate.

Fig. 49 gives the alternative form of the joint, which is used when overhanging eaves are not desired. This reversed form allows the inner shoulder, coming against the edge of the wall plate, to take the outward thrust directly, and makes the joint a very strong one. This also is secured by nailing, as shown in the diagram.

In brick buildings, the wall plates should be bedded securely along the top of the walls, either by cementing them in or by carrying up the outside course to leave a bed along which they may lie. The general custom at the present day, however, is to place the wall plate on the outer course of the brickwork, thereby obtaining a great deal more air space over the whole area of the roof, and between it and the ceiling beneath.

In wooden buildings, the wall plate is provided by the top rail of the framing on each side, as in Fig. 53.

RIDGE JOINT.—At the head of the rafters, in the ordinary light span roof, the joint is formed by trimming the ends of the rafters to butt against the ridgepiece, as in Fig. 50. The ridgepiece is shown by dotted lines.

The joint is secured by nailing at an angle through the ends of the rafters into the ridgepiece, and, for additional strength, a cleat may be nailed across the rafters in the manner shown. This cleat is notched to receive the ridgepiece.

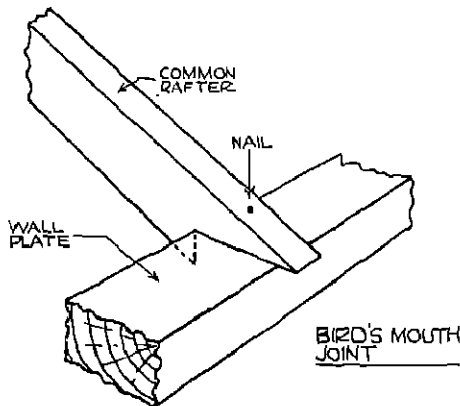
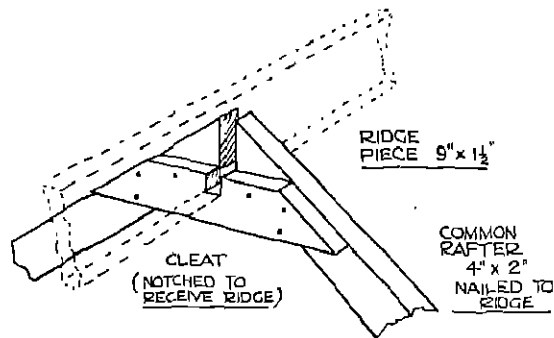
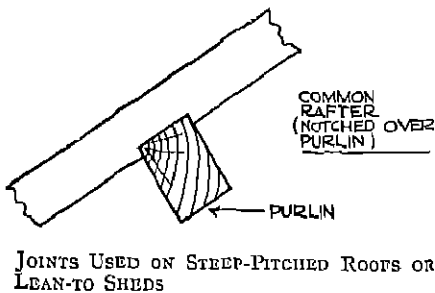


FIG. 49



JOINTS AT RIDGE IN COUPLE ROOFS

FIG. 50



JOINTS USED ON STEEP-PITCHED ROOFS OR LEAN-TO SHEDS

FIG. 51

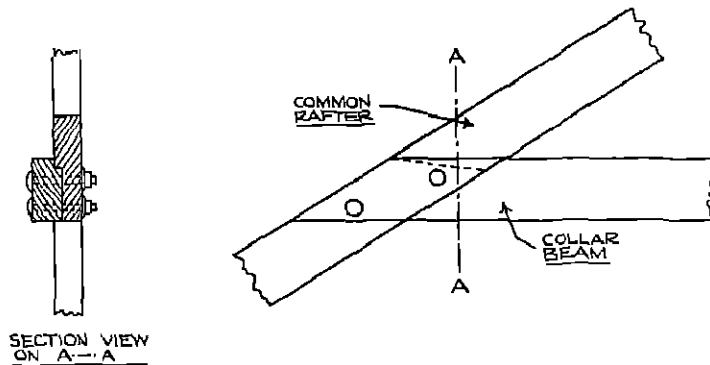
NOTCHED JOINT.—If the distance between the ridge and the wall plate exceeds 8 ft., one or more purlins should be put in to support the common rafters. The purlins are supported by the end walls, and their real purpose is to take some of the weight of the roof, which otherwise would tend to thrust out the side walls.

Only small buildings are likely to be attempted in the school grounds, so that purlins should not be needed except in the case of

lean-to roofs. Fig. 51 shows the notched joint which should be used between the rafters and the purlin on such roofs, or on other roofs which are steeper than the average pitch of $\frac{1}{4}$ to $\frac{1}{3}$ of the span.

JOINT FOR COLLAR-BEAM ROOFS.—This type of roof is used for buildings having a span of from 12 ft. to 18 ft., so that it is unlikely that it will be required for the work in an average school. It is possible, however, that a shed or workshop having such a span might be needed for a special purpose, and therefore, some necessary details are included here.

The collar-beam roof is really the same thing as the couple roof with the addition of a tie rail. This rail, known as a collar beam, converts each pair of opposite rafters into a light



JOINT FOR COLLAR-BEAM ROOFS

FIG. 52

truss, resisting the spreading tendency of the heavier roof which follows upon the increase in width of span.

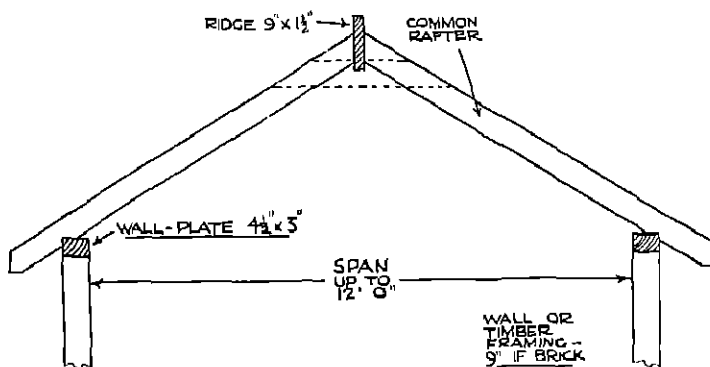
Fig. 52 shows the dovetail joint which is used at the junction of the tie rail with the rafter. The principle is that of the halving joint, but the stuff is not let in for half the thickness as this would weaken it seriously. In consequence, the joint needs to be secured by bolts, in the manner shown in the diagram. Washers are necessary.

ROOFS

COUPLE ROOF.

The couple roof is used for spans up to 12 ft. It is the most useful type of roof for small store sheds, tool shed, etc., which have to be built in isolated positions.

No collar beam is necessary unless the span exceeds 12 ft. A cleat may be added, as shown by the dotted lines in the diagram, Fig. 53, but is not necessary for spans up to 8 ft.



COUPLE ROOF

FIG. 53

The sizes given are slightly on the heavy side, so that they may be reduced proportionately to suit the span of any particular building. For instance, 3 in. by 2 in. common rafters are quite strong enough for a small building, having a span of 7 ft. to 8 ft.

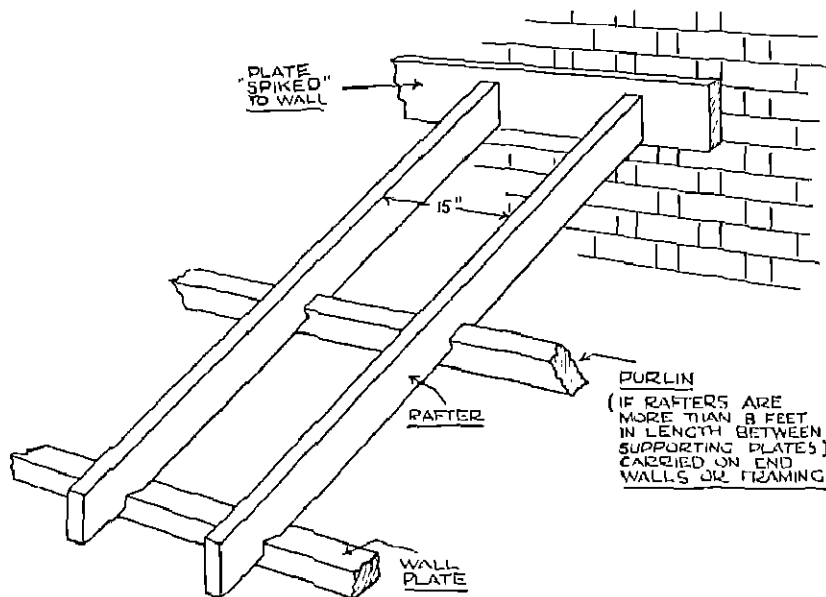
In Fig. 53 is shown the additional height of the ridge which is gained by using the ordinary bird's mouth joint, with overhanging eaves, as compared with the reversed bird's mouth joint, in which the upper edges of the common rafters meet the outside edges of the wall plates. This latter method drops the whole roof several inches, and considerably reduces the air space contained inside it.

Common rafters should be placed at intervals of 15 in. or 16 in. along the wall plates, on each side wall of buildings in which the end walls are carried straight up to the ridge. The dwelling-house type of roof, which is pitched from all four walls to a shorter ridgepiece, and which necessitates the use of hip rafters, is unlikely to be needed for school woodwork purposes.

Purlins are not needed on small spans, and the roof is finished by nailing on tongued and grooved boarding, followed by some form of roofing felt, Ruberoid, etc. Alternatively, fillets may be nailed to the boarding, and the roof may be finished with wooden shingles, or tiles. Details of these methods are given in Fig. 110.

LEAN-TO ROOF.—This is adopted when it is desired to utilise one wall of a building already in position as one of the walls of the hut. The plate which is fixed to this wall may be "spiked" on to it, or, if the wall is sufficiently low already, it may be placed on top of it in the usual manner.

If the width of the building is 8 ft. or more, purlins should be used as shown in Fig. 54. These are carried on the end walls, of brick or wooden framing, and they help to distribute the weight of the roof.



LEAN-TO ROOF

FIG. 54

COLLAR-BEAM ROOF.—This is a heavier type of roof than would normally be needed for the purposes of the course, but should a building of 12 ft. to 18 ft. span be required for, say, a sports pavilion, this roof construction should be adopted.

Each opposite pair of rafters is framed into a light truss by the addition of the collar beam and the cleat at the ridge. Details of suitable sizes for the various members are given in Fig. 55.

The work is not beyond the powers of a group of senior boys, but as each truss is best assembled before it is hoisted into position, the weight is considerable. Lifting gear will not be available for this purpose, and the trusses will have to be placed in position upside down. Then, if a notched spar and a rope is used, they may be swung up into place and steadied there whilst a batten is nailed across the rafters to hold them steady.

If this method is used, the ridge piece is fitted last of all, when the rafters are finally nailed to it.

Alternatively, the two end trusses may be steadied in position whilst the ridgepiece is fitted and nailed; the remaining rafters, collar beams and cleats being assembled on the roof as the work proceeds. For school work this is the safest method to adopt, as the trusses may be fitted up on the ground, and then dismantled before re-assembly in position. This must be done to ensure that the holes for the collar beam bolts are bored in the right places when the joints are fitting correctly.

The advantage possessed by this type of roof is that most of the "spreading" thrust, which tends to push out the walls, is taken up by the trusses themselves, so that the roof is simply a dead weight upon the wall plates. The additional weight involved is an advantage rather than a drawback in situations where the building is exposed to strong winds.

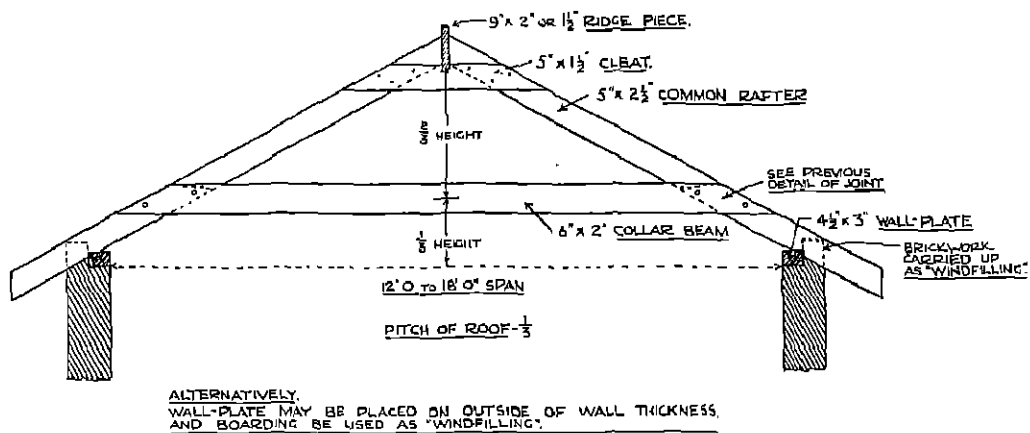
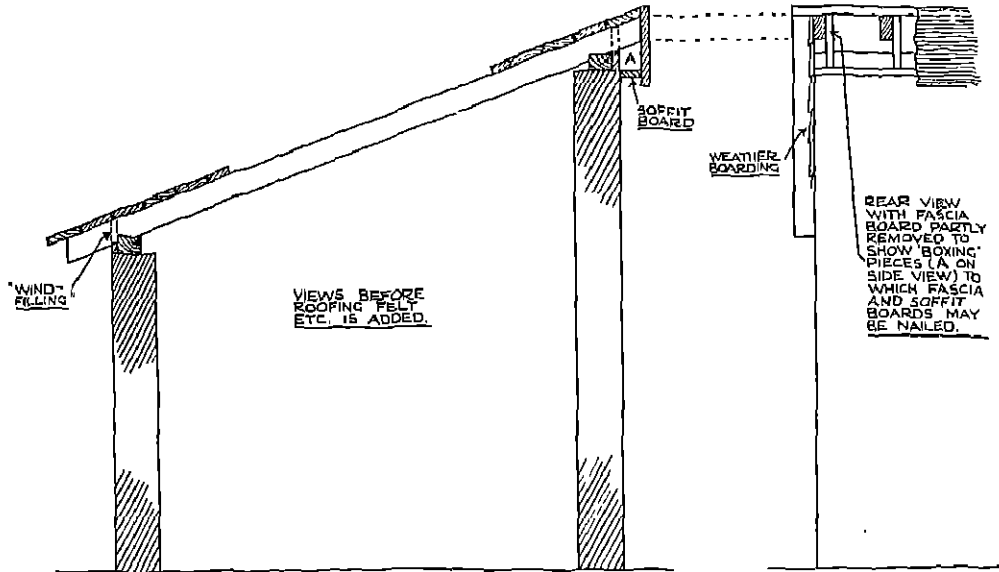


FIG. 55

LEAN-TO ROOF ON EXISTING WALLS.—It often happens that a roof of this kind is needed, or that an old roof has to be replaced.

The details of one suitable method of construction are given in Fig. 56. It will be seen that, to avoid the whole roof being lifted off by wind pressure, the back is not only boarded in with "wind-filling" as shown by the dotted lines, but is completely enclosed by nailing on a fascia board and a soffit board to the "boxing pieces" shown in the diagrams. In addition, this method of finishing the back makes the whole job watertight, as the roofing material is carried right down over the fascia board, and is turned up underneath it to the soffit board, thus forming a "drip."

Rafters 3 in. by 2 in. with $\frac{3}{4}$ in. tongued and grooved boarding, would be strong enough for this roof. The Ruberoid or other roofing material is held in place by fillets, running up the roof and not along it.



LEAN-TO ROOF ON EXISTING WALLS

FIG. 56

JOINT USED FOR BRACES, BRACKETS AND ROOF-MEMBERS.—The joint shown in Fig. 57 is called the "tie-beam" joint. It is a variation of the bridle joint which is used a great deal in light building work, particularly, as its name implies, in roof trusses, and also at the ends of braces or struts. Detail is shown in Fig. 58.

The square shoulder at the end of the brace makes the joint exceptionally strong for its purpose, which is to enable the brace to hold the outer framing rigid against any side thrust tending to "fold" the whole framework. As it operates only against a thrust in one direction, it is customary to add a second brace sloping the other way. Details of arrangement vary in individual cases, but the commonest form of brace is one which is fitted diagonally between opposite corners of a rectangular framing.

FIG. 57

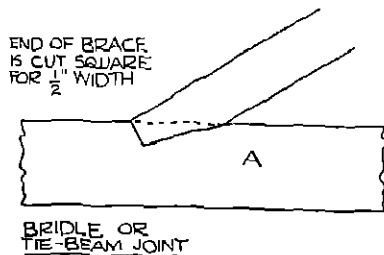
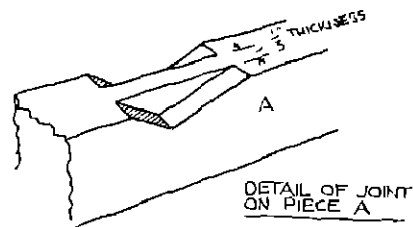


FIG. 58



JOINT USED FOR BRACES, BRACKETS, AND ROOF-MEMBERS

FIG. 59

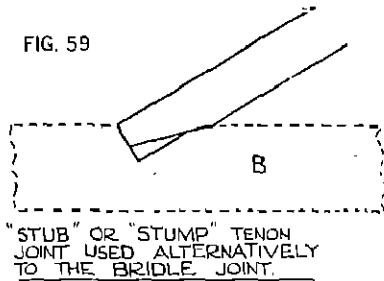
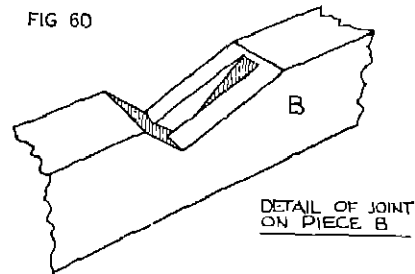


FIG. 60



The danger attaching to this joint, in which the ends of the brace are shouldered to fit in the angle of the framing, is that under pressure the brace tends to force open the corner joints of the framing.

This is avoided if the tie-beam joint is used, as the end of the brace does not bear into the corner but is some distance from it.

In Fig. 63 is shown a framing braced in this way, with the inner vertical members, or "studs," cut and fitted up to the brace. They are nailed in position as shown in Fig. 62.

An alternative form of the same joint is shown in Fig. 59, in which a "stump" tenon is used, and this style is adopted for heavy material under stress. The mortise is shown in Fig. 60.

The commonest purpose to which the joint is put is shown in Fig. 61, which illustrates the kind of bracket made to support a wide shelf, or a fairly heavy weight. In itself, the bracket makes a very good exercise.

Brick walls must be plugged before the brackets can be screwed home, and to do this the holes are made with a cold chisel. After each blow given by the hammer, the chisel is turned slightly in the hole so that it is continually rotating while the hole is being made. This movement prevents the chisel from becoming jammed or "wandering," and enables a clean, straight hole to be cut. The plug should be cut from straight-grained wood, and should

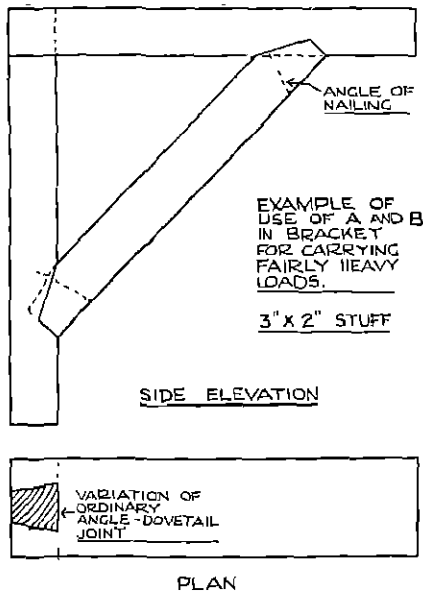
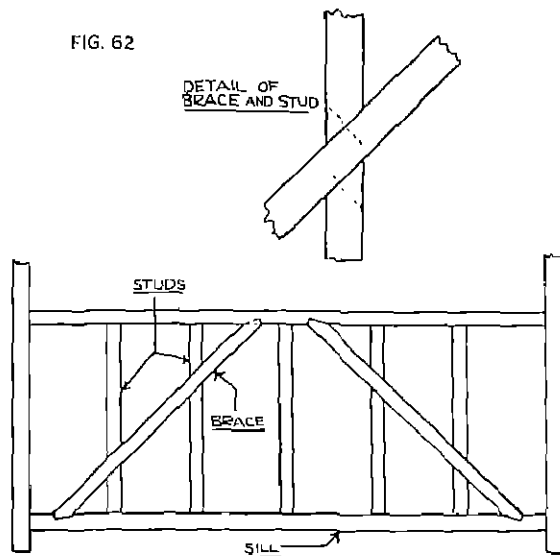


FIG. 61

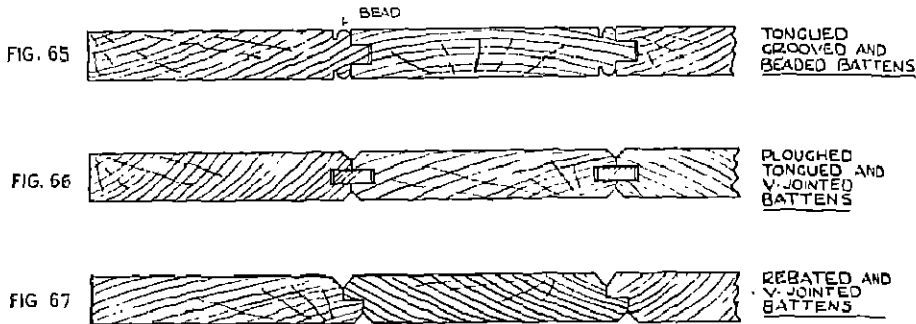
FIG. 62



FURTHER APPLICATIONS OF THE TIE-BEAM JOINT

FIG. 63

not be smoothed up on its outside surface fitting in the hole. For heavy work, hardwood plugs should be used, of such a size that they will just enter the hole cut to receive them, and slightly wedge-shaped in length. Careful attention should be given to the plugging of walls, as any slackness may result in a bad accident when the plugs pull out, as they will do if they are not properly fitted.



TYPES OF BATTEN USED

LIGHT DOORS

LEDGED AND BRACED DOORS.—In Fig. 64 is given the back view of the simplest type of door for use in a wooden building. It consists of tongued and grooved battens nailed to stout ledges and to diagonal braces.

The braces should be arranged in every case to rise from the hanging edge of the door. Their purpose is to prevent the opposite edge of the door from the hanging, or the hinged edge, from dropping, and some of their effectiveness will be lost if the door should be hinged on the wrong edge.

As there is no outer framing round a door of this type, it is advisable to use strap hinges of a fair length. These are fitted on the front of the door and in line with the ledges at top and bottom.

Figs. 65, 66, 67 show three types of batten used for this kind of door, of which the tongued, grooved and beaded batten is the most common.

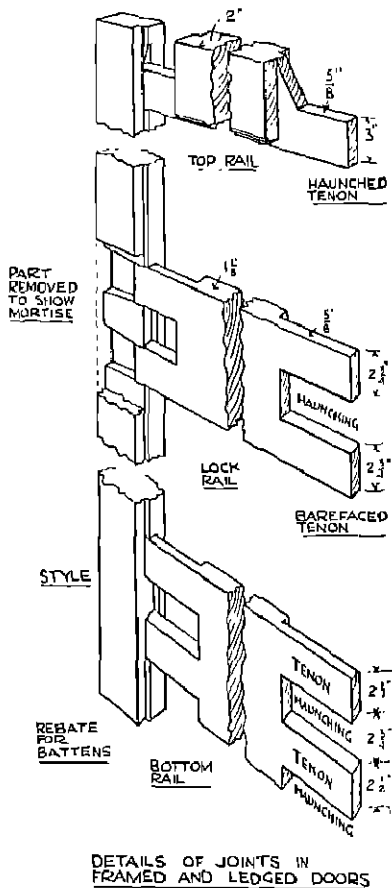
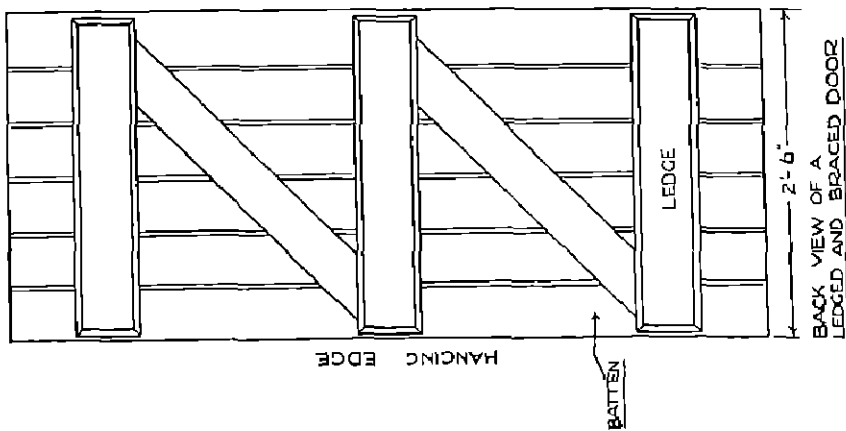


FIG. 67a

FRAMED, LEDGED AND BRACED DOORS.—These are much heavier doors, of which an example is shown in Fig. 68. The braces are jointed to the ledges, which, in turn, are jointed by mortise and tenon to the styles. This framing, combined with the nailing on of the battens (usually rebated and V-jointed) makes an exceptionally strong door suitable for a brick building.

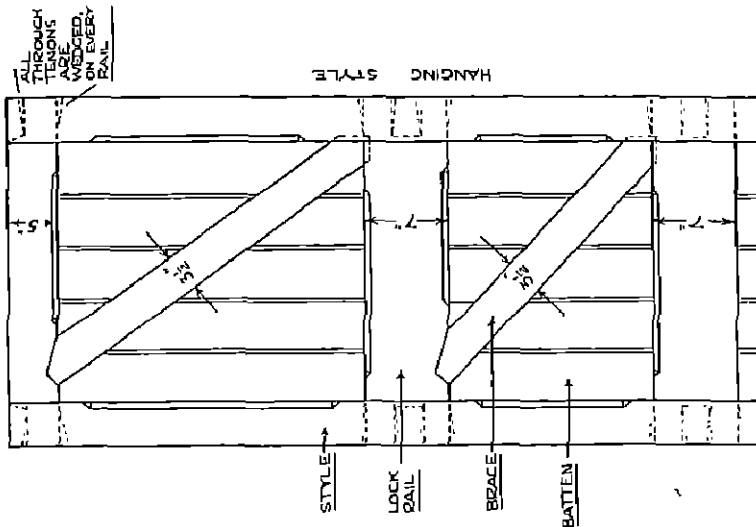
The making of such a door, though not an impossibility, would be a heavy and exacting task for the school workshop. All the joints with mortise and tenon

FIG. 64



BACK VIEW OF A
LEDGED AND BRACED DOOR

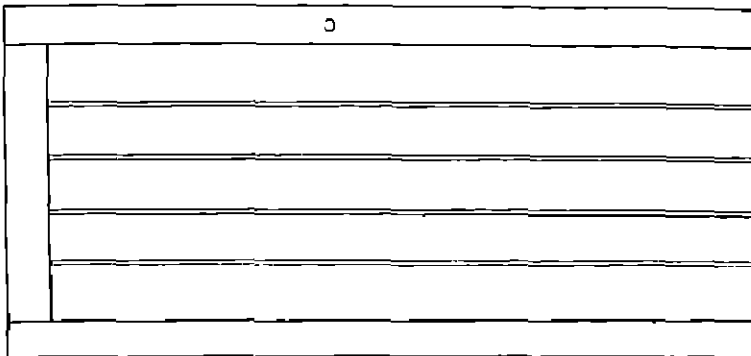
FIG. 66



BACK VIEW OF A FRAMED,
LEDGED, AND BRACED DOOR,
SHOWING BRACES IN REVERSE
DIRECTION AS FOR DOOR WHICH
TO OPEN LEFT-HANDED

FIG. 68 (CONTD.)

$\frac{1}{2}$ " REBATE



FRONT VIEW OF SAME DOOR

CONSTRUCTION OF LIGHT DOORS—LEDGED AND BRACED, AND FRAMED, LEDGED AND BRACED

are brought right through the styles, and wedged. The details of these joints are given in Fig. 67a. It will be seen that double tenons are made on the centre or lock rail, and that this rail and the bottom rail are made of thinner stuff than is used for the styles and the top rail. The latter are rebated to take the battens, and the lock rail and bottom rail are made thinner by an amount equal to the depth of the rebate, so that the battens may lie flush with them in the framing.

This door, being framed with styles, is hinged in the usual way, on the edge to which the braces descend.

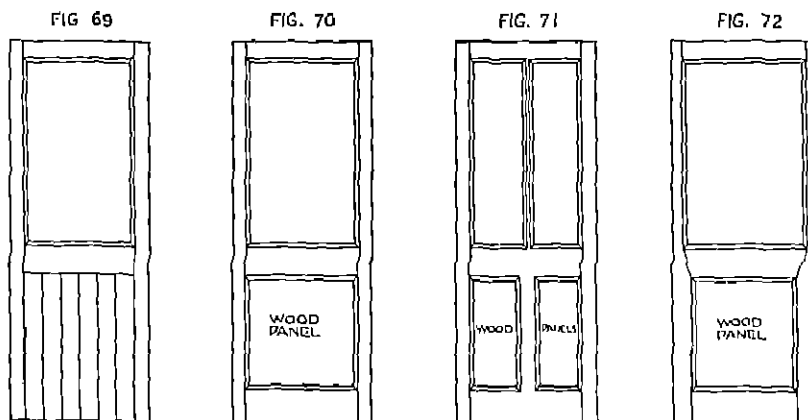
A door of this type should not be attempted unless the workshop is provided with an adequate supply of T-section joiner's cramps. The ordinary sash cramps are of plain bar section, and these are not rigid enough for heavier work; but, if joiner's cramps up to 4 ft. in length are used in the ordinary way for lighter work, extension bars may be obtained for these and may be fitted to them for the longer and heavier work.

SASH DOORS.—Four arrangements of sash doors are given in Figs. 69, 70, 71, 72. Any door containing glass panels is a sash door, and the most correct method of framing one is shown at Fig. 72, in which "diminishing" styles are included. Owing to the reduction in width from the lower part of each style to the upper part, the splayed shoulders on the lock rail make the construction more difficult than that of Figs. 69, 70 and 71. It is suggested therefore, that any one of the first three constructions might be used in preference to the one shown in Fig. 72.

In each of the cases illustrated, the rebate has been carried right down the length of the styles. This simplifies the construction, and permits of a panel being put in the lower part of the door, as in Fig. 70. This panel may be held in place by a beaded fillet, which is securely bradded to the framing.

In Fig. 71 is shown the use of the same construction, with the addition of a sash bar to give two lights and a muntin to divide the lower part into two panels.

The correct design, shown in Fig. 72, has a single wooden panel which is grooved into the framing. This means that the lower part of the styles has to be ploughed out as a groove



ARRANGEMENT OF SASH DOORS

NOTE

SASH DOORS SHOULD BE MADE WITH "DIMINISHING" STYLES, (SEE FIG. 72) BUT THIS WOULD GREATLY INCREASE THE DIFFICULTIES OF SETTING-OUT AND MAKING UP, AND IS NOT ADVISED.

to take this panel, whilst the upper part is rebated for the glass, Fig. 73. The lock rail thus has a rebate on the top edge and a ploughed groove on the lower edge.

Normally, the glass is put in from the front or outside face of the door, and is puttied into place, but it is becoming quite a common practice to rebate the inner edges of the door instead, and to have the moulded arris on the outside, the glass being held in place by a wooden fillet on the inside. The front doors of many dwelling-houses are being made in this way at the present day.

Light sash doors are needed for greenhouses and interior partitions.

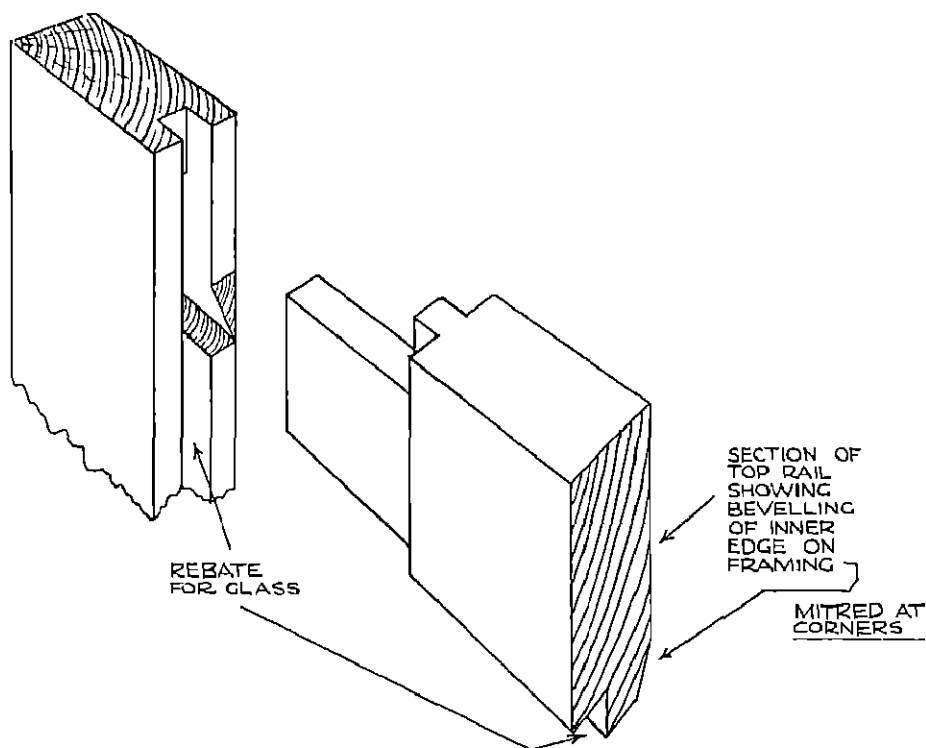


FIG. 73

PANELLED DOORS.—It is unlikely that panelled doors will be required for the small buildings erected on school premises, but as other types will be made it is advisable to give the boys some knowledge of their construction.

The framing is the same as for the ledged and framed door, with the addition of muntins instead of angled braces, and all the inner edges of the framing are grooved to take the panels.

Through mortise and tenon joints are used for the outer framing, with stump tenon joints for the muntins. The haunched mortise and tenon joints are wedged from the outside in every case, as shown in Fig. 78, and the "horns" of wastewood are left on the ends of the styles to give support while this is done. These "horns" are not cleaned off until the glue has hardened and set.

In Figs. 75, 76 and 77 are shown three methods by which the panels may be fitted to give a changed appearance to the moulded edges of the framing. The purpose of the bead in Fig.

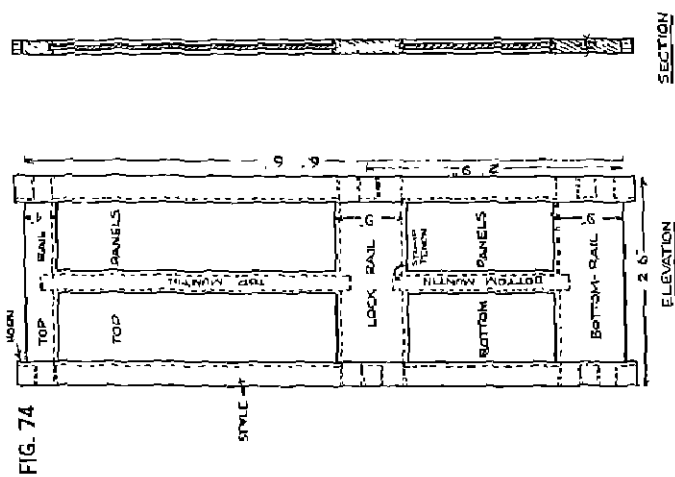


FIG. 74

FIG. 75

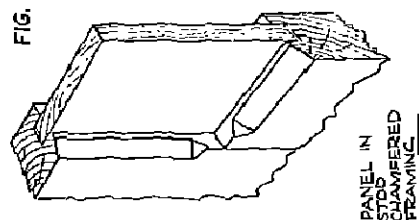


FIG. 76

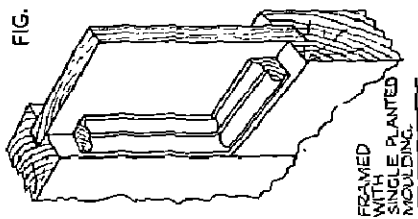


FIG. 77

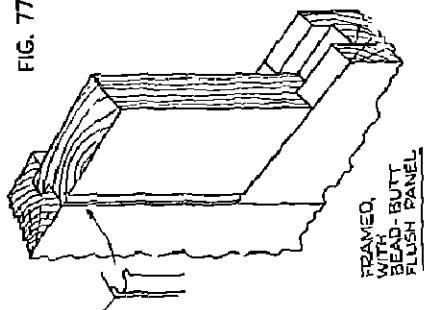


FIG. 81

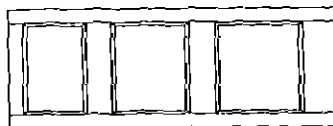
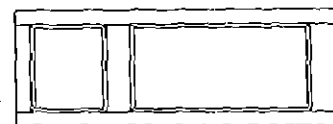


FIG. 80



FIG. 79



ARRANGEMENTS OF LIGHT FRAMED AND PANELLED DOORS

PANELLED DOORS

ELEVATION AND SECTIONS OF A FOUR-PANELLED DOOR

77 is to provide against the appearance of an ugly gap, should any shrinkage take place in the panel.

Figs. 79, 80 and 81 illustrate three different arrangements of light framed and panelled doors, of which the centre one is likely to be the most useful for school work. The wire netting is fitted into a rebate, and is held with small galvanised iron staples, after which the rebate is lined on the inside with a wooden fillet, bradded to the framing.

The two remaining examples are more suited to a dwelling-house, or they might be fitted to a partition. In both cases, three-ply panels could be used, both to avoid shrinkage and to ensure lightness of the door.

TOOLS.—In no case should door construction be attempted unless the suitable tools and equipment are available. The essentials are:

1. A good bench, with the ordinary kit of bench tools.
2. At least three joiner's cramps.
3. A plane, of the universal type, which can be used for accurate fillistering and ploughing of both through and stopped rebates and grooves. Such a plane will also do all the mouldings, beadings and matchings which may become necessary.

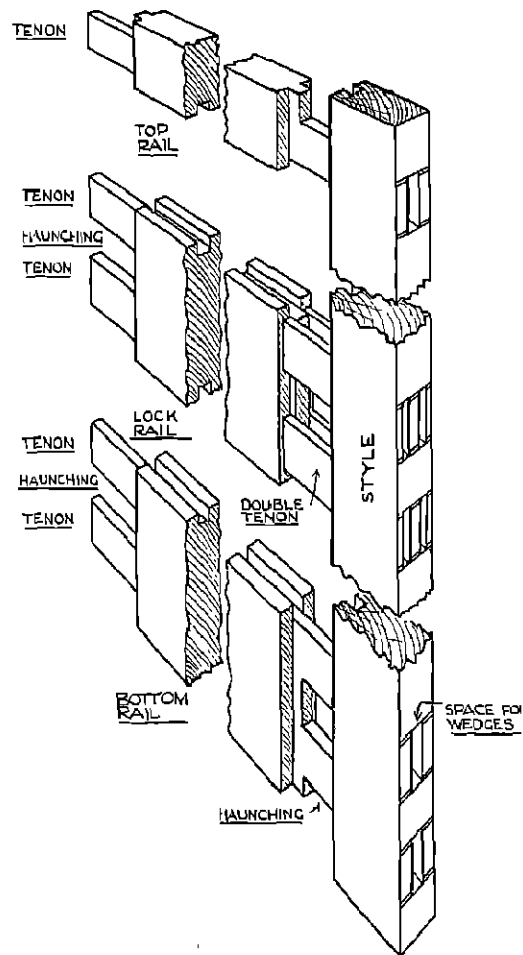
ROOF LIGHTS AND WINDOW FRAMES

JOINTS AND FRAMINGS APPLICABLE TO SKYLIGHTS AND COLD FRAMES.

The constructional details shown in Fig. 82 are those of a fixed skylight or roof light, which is fitted directly upon the roof members prepared for it, shown in Fig. 84. The light may then be made weatherproof by carrying the roofing material, such as Ruberoid, up and over the edges, except in the case of the bottom rail of the light framing. Although this is not the normal method, it is a simpler expedient for school purposes.

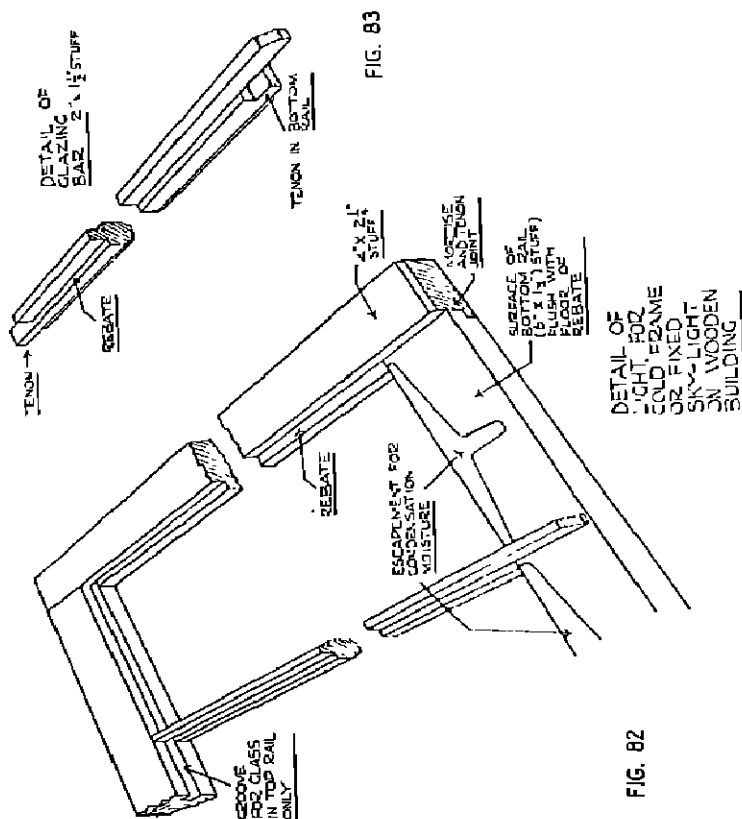
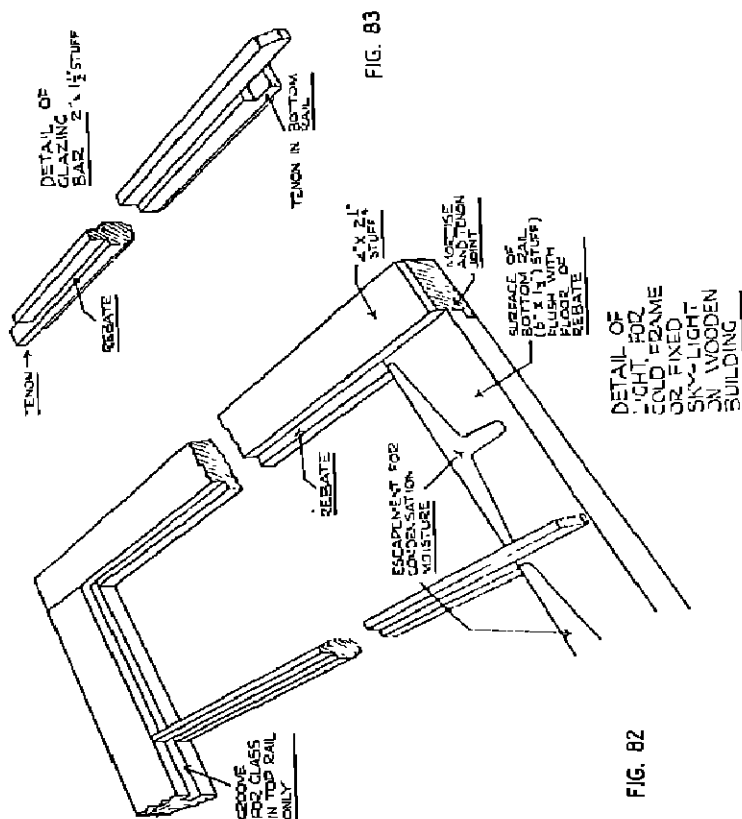
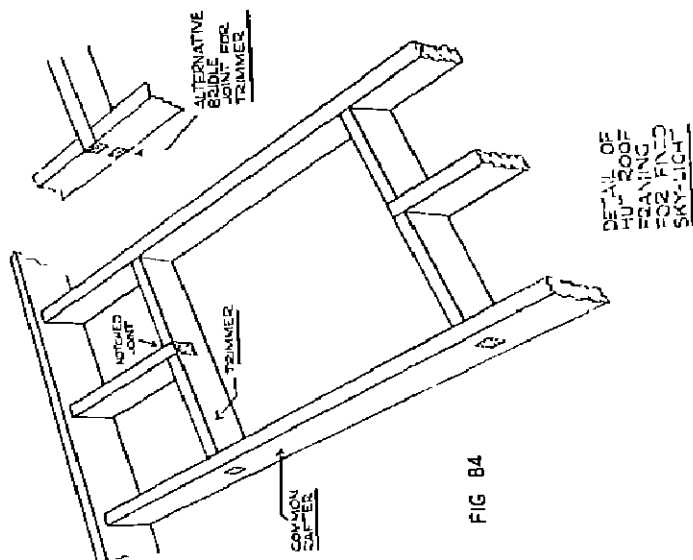
In the case of a hinged light, the top is left on the same level for hingeing, and is protected by the roofing material or by lead flashing, whilst an additional framework is fitted to the rafters to lift the remainder of the light above the normal roof level. The light is raised about 3 in. at the bottom edge by this extra framing, which is either covered or flashed like the top edge of the light. A drip channel should be ploughed along the underside of each style, and a sufficient overhang should be allowed at the sides and the bottom for this to take effect. A casement stay is fitted, with which the light may be propped open in fine weather.

Fig. 82 shows that the styles and top rail are made of rebated stuff, which is through-mortised and tenoned together, the rebated edges being franked instead of being mitred.



DETAILS OF JOINTS
IN PANELLLED DOORS

FIG. 78



Roof Lights--Joints and Framings Applicable to Sky-Lights and Cold Frames

The bottom rail is less than the styles in thickness by the depth of the rebate, so that the glass may be carried over its edge and may lie flush on its face side.

One or more glazing bars may be fitted, the details of which are given in Fig. 83.

It will be noticed that shallow depressions are cut in the bottom rail which lead into a short groove, one in each light. These grooves rise to the surface of the rail just before they reach the bottom edge. The purpose of these sunk surfaces, known as escapements, is to allow a means of escape for the moisture formed by condensation. This moisture will always collect on the underside of the glass when cold weather makes it necessary to keep the light shut, and, unless it is allowed to escape, it will drip into the room beneath in an annoying manner.

The roof members are framed as shown in Fig. 84 to carry a fixed skylight. The only alteration necessary is the cutting of one or two of the common rafters to form the hatch, and the insertion of two trimmers or cross members to carry both the light frame and the ends of the cut rafters. The hatch is framed up before the rafters are placed in position; for this purpose the mortise and tenon joint is preferable to the bridle joint, as the main stress comes on to the two outer rafters forming the sides of the hatch, and the mortise and tenon joint is less weakening for these members.

The roof boarding may be finished flush with the edges of the hatch, so that the light is fitted afterwards and the whole thing is made watertight by the roofing material.

To be correct and in accordance with the normal practice, this type of framed light should be used only for a hinged skylight, when it is raised upon an additional framing or "curb" as described above. The normal fixed skylight construction is shown in Fig. 85.

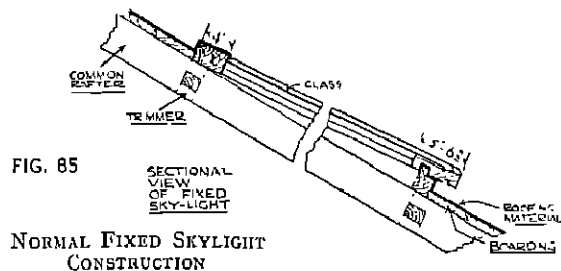
Glazing bars should not be more than 12 in. to 16 in. apart, and if possible, the glass should be in one length in each light between bars.

In Fig. 85 the light frame is shown to be raised by a tongued bar over which the grooved bottom rail of the frame fits, with the roofing material carried between them to make a weather-proof joint. In addition, a drip channel is cut in the bottom rail.

The sides of the frame are supported by tapered pieces of stuff which are nailed to the inside of the top edges of the common rafters, leaving enough width for fixing the ends of the roof boards. The roofing material is carried up over these also, and right over the top rail, as shown.

This is the correct method of fitting a fixed skylight, and the same system may be adopted for the hinged light, instead of raising the whole framing upon a special "curb."

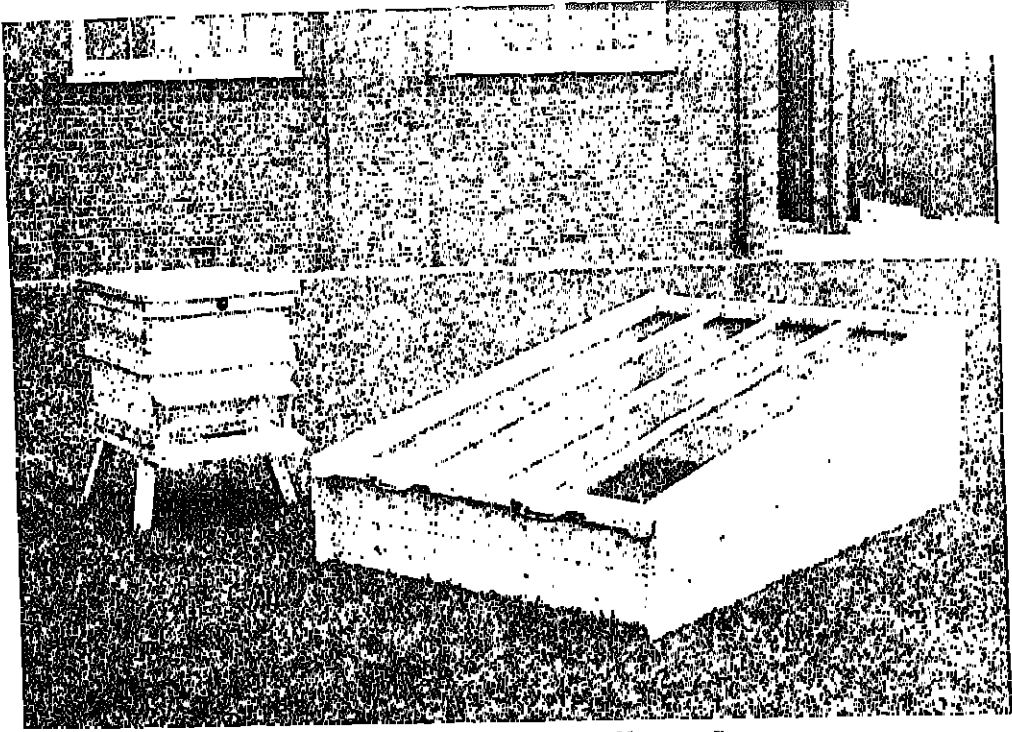
It should be remembered that these details apply only to wooden roofs finished with shingles or other roofing material, such as the Ruberoid already mentioned. If the building is roofed with tiles or slates, lead flashings must be used, and the details will vary from those given above. But as such work is outside the scope of a school course it is not necessary to include these details here.



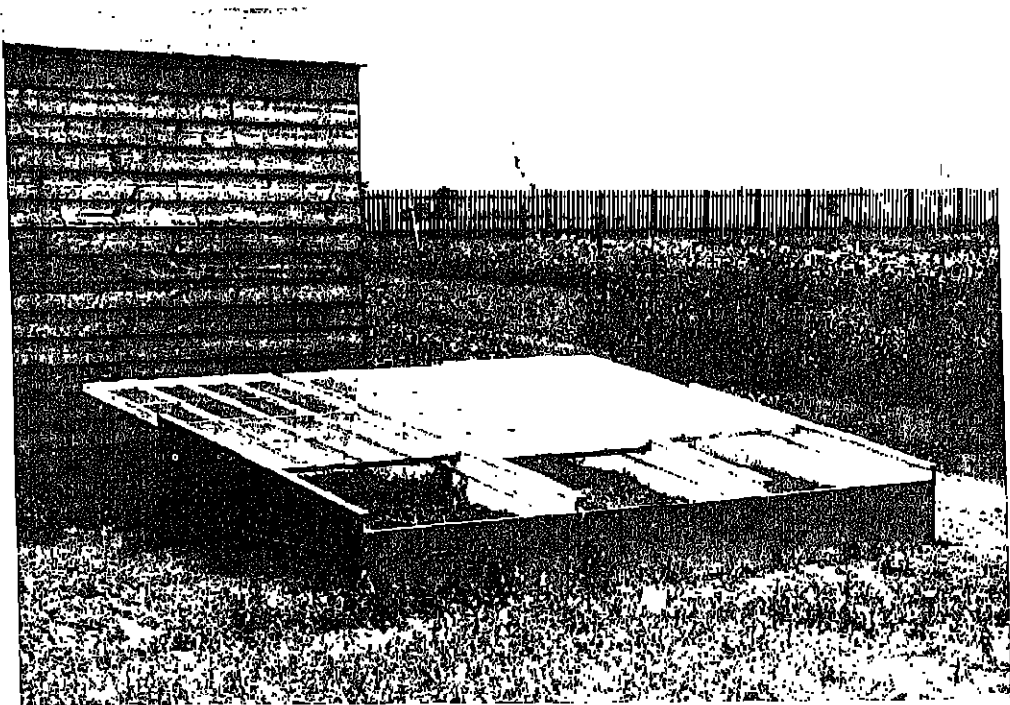
GARDEN FRAME.—A convenient garden frame for school use will conform to the following specification:

Over-all size— 7 ft. by 5 ft.
 Lights— 5 ft. by 3 ft. 6 in.
 Height at front—11 in.

Height at back—22 in.
 Glass— 21 oz.



GARDEN COLD FRAME AND BEEHIVE MADE IN SCHOOL.



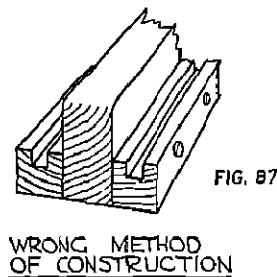
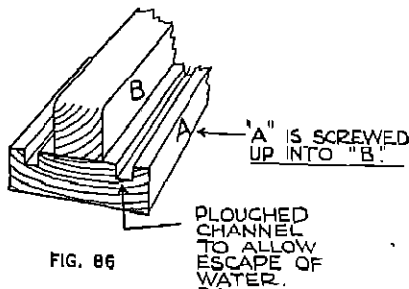
LARGE GARDEN COLD FRAME

It may be made of deal: the lights may be of the same size as those used for the roof light, and the frame itself of 1 in. tongued and grooved boards. Both the frame and the lights are finished with one priming coat of paint, and at least one finishing coat.

In Fig. 86 is shown the correct method whereby the centre strut which carries the lights is screwed up to the top guide. In Fig. 87 is shown the wrong method.

Channels for the escape of water are ploughed along each edge of the strut, as shown in the diagram, and also along the top edge of each of the frame ends. To each of these ends is nailed a length of board which acts as a guide for the outer edges of the lights.

As the frame itself is seldom moved from its first position, it is not necessary to complicate



DETAIL AT FOOT OF CENTRE MEMBER

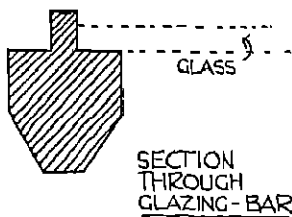


FIG. 88

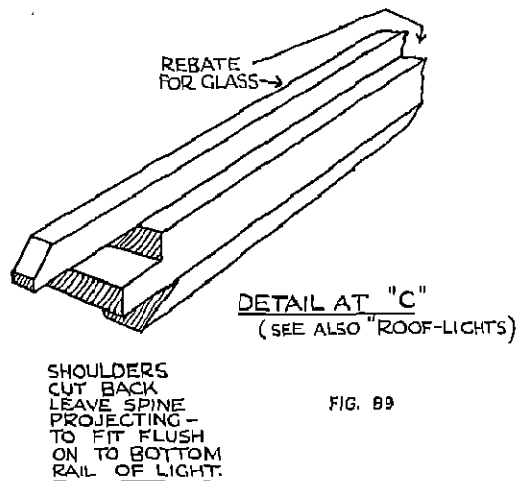


FIG. 89

the construction. The frame may be nailed together, the corners being strengthened by blocking with pieces of square stuff nailed into place.

The strut is let into the front and back edges of the frame, to lie flush with them, and a button is screwed on to the top of the centre guide to prevent the frames from being lifted by strong winds.

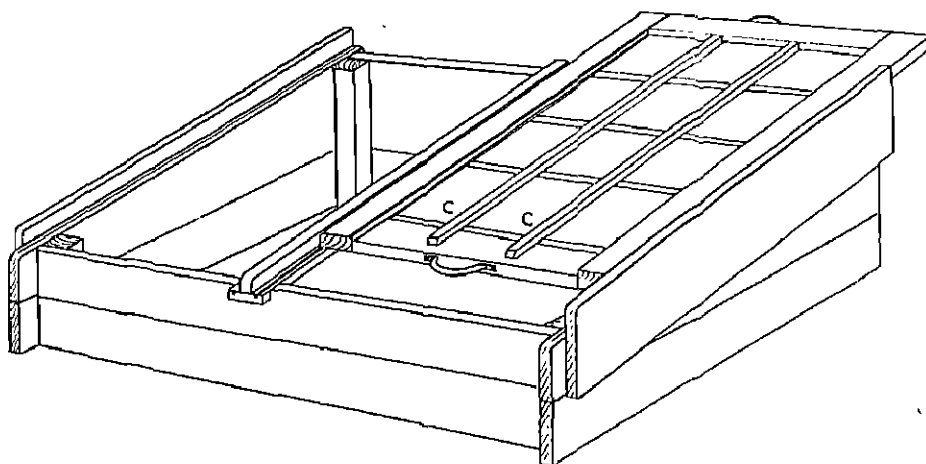
The construction of the two lights is the same in detail as that given for the roof light, although the glazing bars may not be quite so large in section. Details of these bars are given in Fig. 88 and Fig. 89. The glass should be grooved into the inside edge of the top rail of each light.

The panes of glass should not overlap by more than $\frac{1}{2}$ in., and they should be bedded into putty or paint, and then be sprigged into place on the outside. For this purpose small sprigs which are like small flooring nails, or brads, can be bought.

At one time it was the common practice to use putty on the outside of the lights for the purpose of holding the glass securely in place, but this method has been superseded by sprigging. Putty will not last, and it is continually breaking away from the joint as the oil dries out and the putty hardens.

After the glass is sprigged in, the paint brush should be run along the joint. This line of paint seals it effectively, whilst any subsequent cracking may be remedied easily.

Large frames, of a size greater than that quoted above, are not advisable for school work, nor are they necessary. A frame such as the one shown in Fig. 90 will provide sufficient work for a group of at least four senior boys.



VIEW OF FRAME WITH
ONE LIGHT REMOVED.

FRAME - 7' 0" x 5' 0"
LIGHTS - 5' 0" x 3' 6"
HEIGHT AT FRONT - 11"
HEIGHT AT BACK - 22"
GLASS - 21 oz.

FIG. 90. GARDEN FRAME

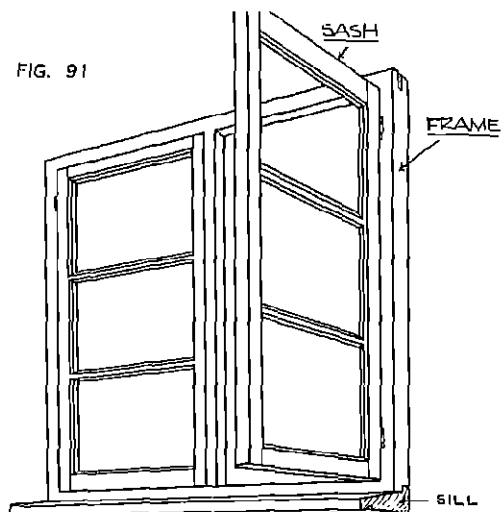
The handles should be attached to the top and bottom edges of the lights, as shown, and not to the top faces of the rails. The lights are heavy, and if the handles are screwed to the top faces there is a danger of them pulling off under the weight of the glass, when the timber is weathered and dry and the screws are rusted.

WINDOW FRAMES AND SASHES.—For small wooden buildings the window frames should be made as simply as possible, and the method given in Fig. 91 will suffice for all ordinary casements.

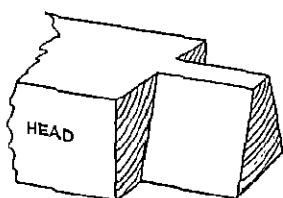
In Fig. 94 is shown in section a common type of frame style which has a wide rebate to take the sash to the outside, finishing in a moulded edge. The inner edge is also moulded or chamfered. This section is very easily run out on a machine, but its use in school involves a great amount of unnecessary work and difficulty, as the shoulders at the corners of the framing have to be scribed for the joints. Therefore, it is suggested that the plain square or rectangular section might be used instead, as shown in Figs. 92, 93 and 95.

For wooden buildings the frames are made to fit between the posts, or studs, and the rails or sills, so that the top and bottom rails do not need to project as "horns." This fact makes it advisable to use some kind of dovetail joint, such as the one shown in Fig. 92.

FIG. 91



A USEFUL TYPE OF CASEMENT SASH
TO OPEN OUTWARDS.
FOR WOODEN BUILDINGS, SHED, ETC.



JOINT AT
HEAD OF FRAME.
FOR WOODEN BUILDING

NOTE: TO SIMPLIFY THE
CONSTRUCTION THE
NORMAL STANDARD
SECTION OF FRAME
IS NOT USED HERE.

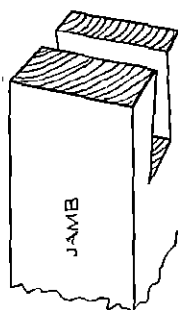
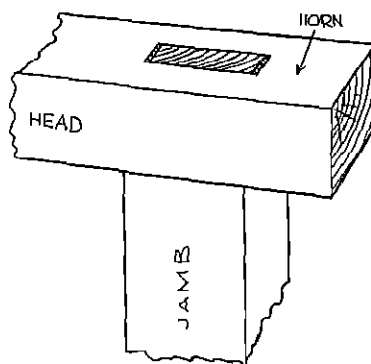


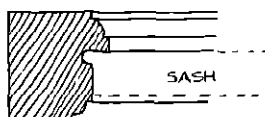
FIG. 92



JOINT AT
HEAD FOR
BRICK WALLS

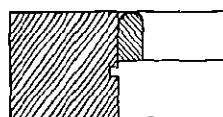
FIG. 93

SIMPLIFIED CONSTRUCTION
SUGGESTED



SECTION OF
ONE COMMON
TYPE OF
FRAME,
NECESSITATING
SCRIED JOINTS
AND SHOULDER
VARIATIONS.

FIG. 94



REBATE
FORMED
BY PLANTING
FILLET.
SASH HUNG
FLUSH TO
OUTER FACE.

FIG. 95

WINDOW FRAMES AND SASHES

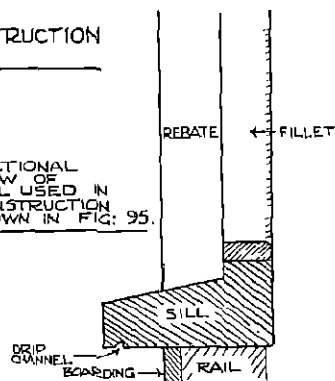
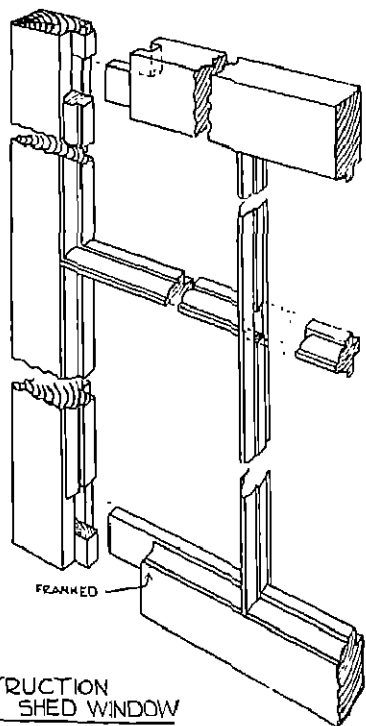


FIG. 96

The mortise and tenon joint is used when the "horns" are left on, and built into the brickwork of the wall, as in Fig. 93.



CONSTRUCTION
OF A SHED WINDOW
SASHES OPENING OUTWARDS

Fig. 95 illustrates the way in which the rebate to take the sash may be formed by planting a fillet on the inside of the frame. The sash may be hung flush with the outer face of the frame, or the latter may be made wider and chamfered on the outside edges beyond the sash. The plain rebate will serve for the top and sides of the frame, but the bottom rail should be "weathered," as in Fig. 96, to throw off rain water which may drive in under the bottom edges.

The correct names for the various members of the frame are:

"jambs" (styles); "head" (top rail); "sill" (bottom rail).

It will be seen from Fig. 94 that a rounded tongue is left on the edge of the casement sash. By fitting into a corresponding groove in the rebate on the jamb of the frame, this forms the weathering of the sides of the sashes. Butt hinges are used for this type of casement.

In the simplified form of construction suggested in Fig. 95, a fairly effective form of weathering for the jambs may be obtained by ploughing a narrow groove along the floor of the rebate, as shown in the sectional view.

CASEMENT SASHES.—The details of a simple window frame for a shed or other wooden building are given in Fig. 97. Two casement sashes are

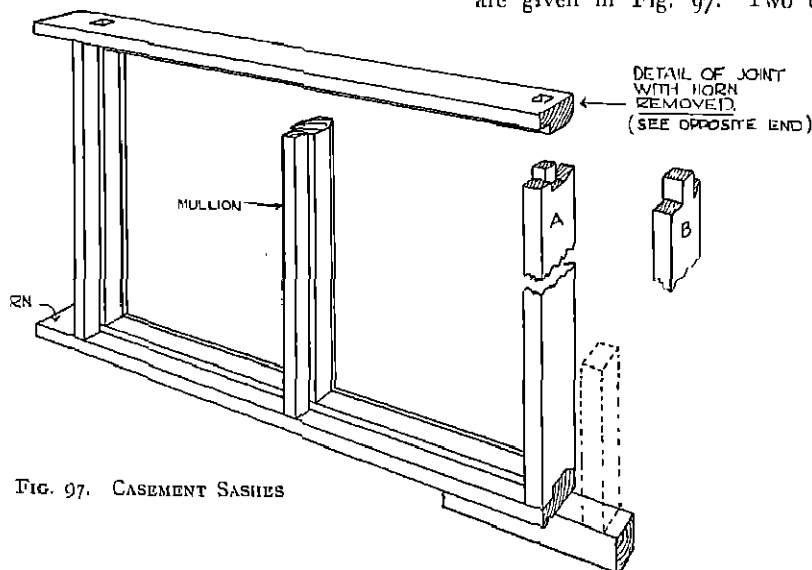
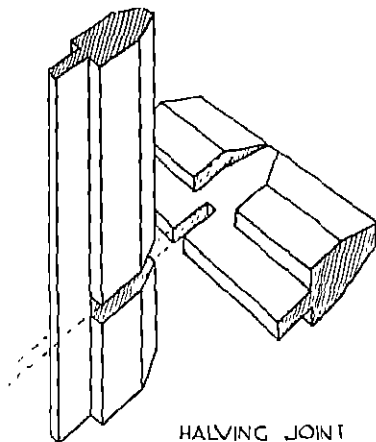


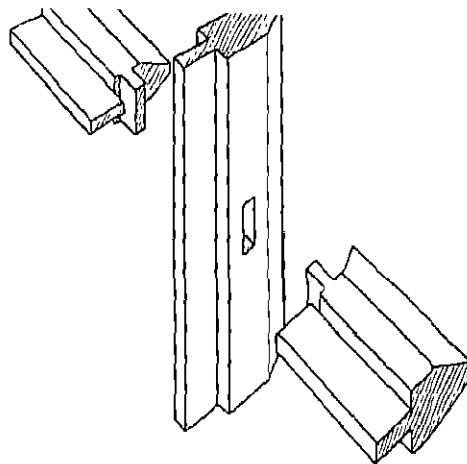
FIG. 97. CASEMENT SASHES

fitted, which open outwards from a centre member of the frame known as a "mullion."

The diagram shows two methods of arranging the tenons at the ends of the jambs. In the first case (A), the tenon is bare-faced on the inside of the jamb so that a shoulder may be left on the outside for sufficient width to allow the head



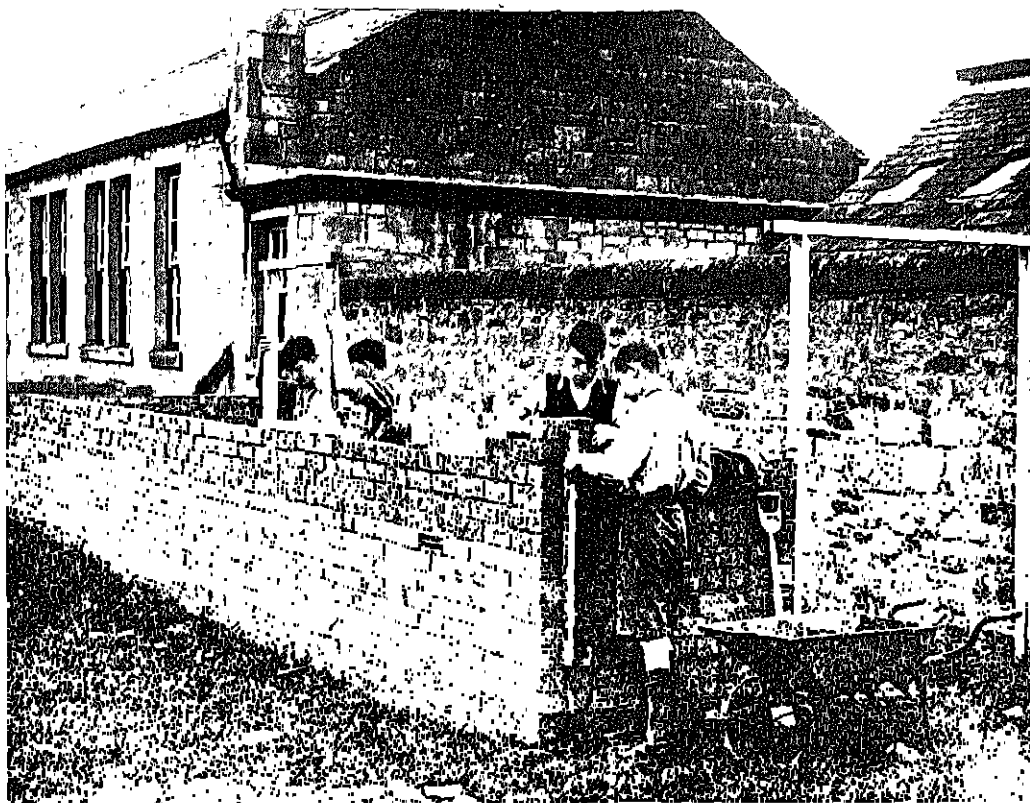
HALVING JOINT
USED WHERE
SASH BARS
CROSS AT
RIGHT-ANGLES



"FRANKED" BARS
MORTISE AND TENON
JOINT WITH SCRIBED
SHOULDERS ON
BEVELLED EDGE.

FIG. 98

FIG. 99



BRICK OUTBUILDING IN THE COURSE OF CONSTRUCTION BY SENIOR SCHOOL BOYS. NOTE THE
"HORNS" ON THE DOOR LINTEL AND WINDOW HEAD FOR LOCKING INTO THE BRICKWORK

and sill of the frame to be cleaned off flush with the jamb. This joint may be used instead of the dovetail shown in Fig. 92.

In the case of B, the width of the tenon is made from the full thickness of the jamb. This is made possible by leaving on the horns, as shown at the other end of the frame, so that there is plenty of strength beyond the mortises on the head and sill.

The mullion is rebated, or "throated," on both sides, to allow the sashes to close in flush with the frame. They are then held by the ordinary casement catches.

The sash construction shown is of the standard type in which the rails and styles are made of rebated and moulded stuff having intervening sash bars. Instead of the moulding, a plain bevel may be substituted as in Fig. 98. Whatever the section through the rails, styles and sash bars may be, it is customary either to frank the ends of the bars into the rails and styles, as in Fig. 92, or to scribe them, the former method being preferable. The crossing of the sash bars is carried out either as in Fig. 98, by halving them; or by franking them with mortise and tenon joints, as in Fig. 99. The latter method is the stronger, but the former ensures the two apparent halves of the cross bar being in a straight line.

It is as well to mention here the difference between these sash bars and the glazing bars used in cabinet work. Sash bars are in one piece in section, and therefore they have to be jointed in the manner shown. The glazing

bars, on the other hand, are built up, the rectangular spine being halved at the cross joints and tenoned into the rails and styles, after which the moulded section is planted on to it—being grooved along the back for this purpose—and mitred at the joints, as shown in Fig. 100. The inside corners of the spine are strengthened by gluing in pieces of stout paper, linen or mull.

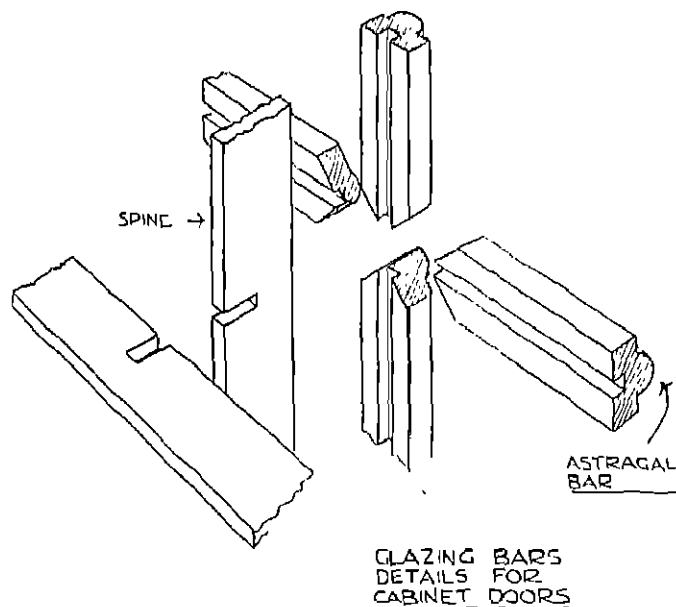


FIG. 100

OUTDOOR PROJECTS

WEATHER STATION.—A great deal of work is involved in the making of a station of the kind shown in Fig. 101. Although the construction may be simplified to some extent, however, much valuable experience will be obtained by the boys if the work is carried out along the right lines. It is a fact that more difficulties are encountered by trying to avoid the standard methods of construction than by taking advantage of the opportunities offered by them for giving a sound training in the fundamentals of this type of woodwork.

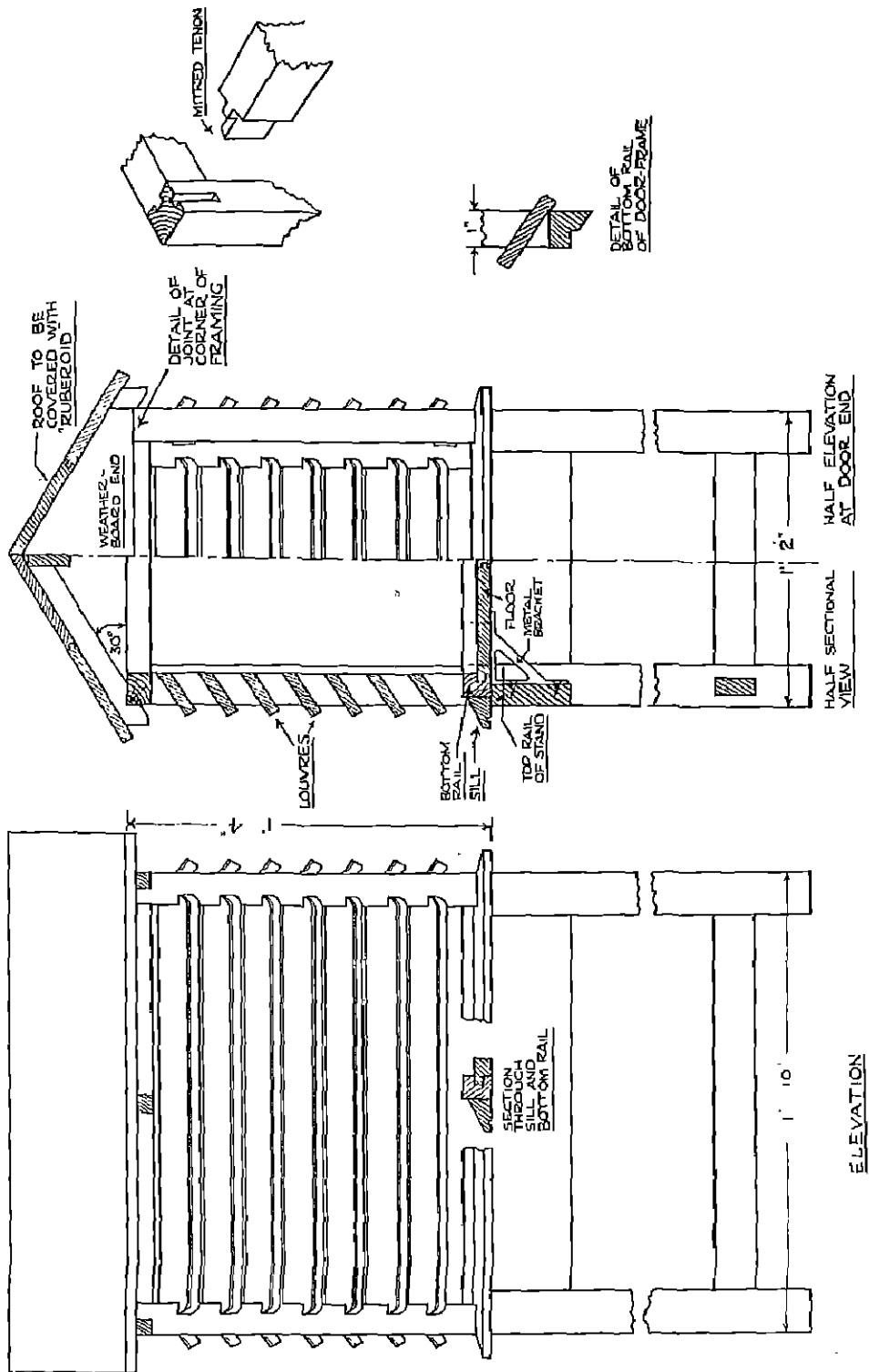
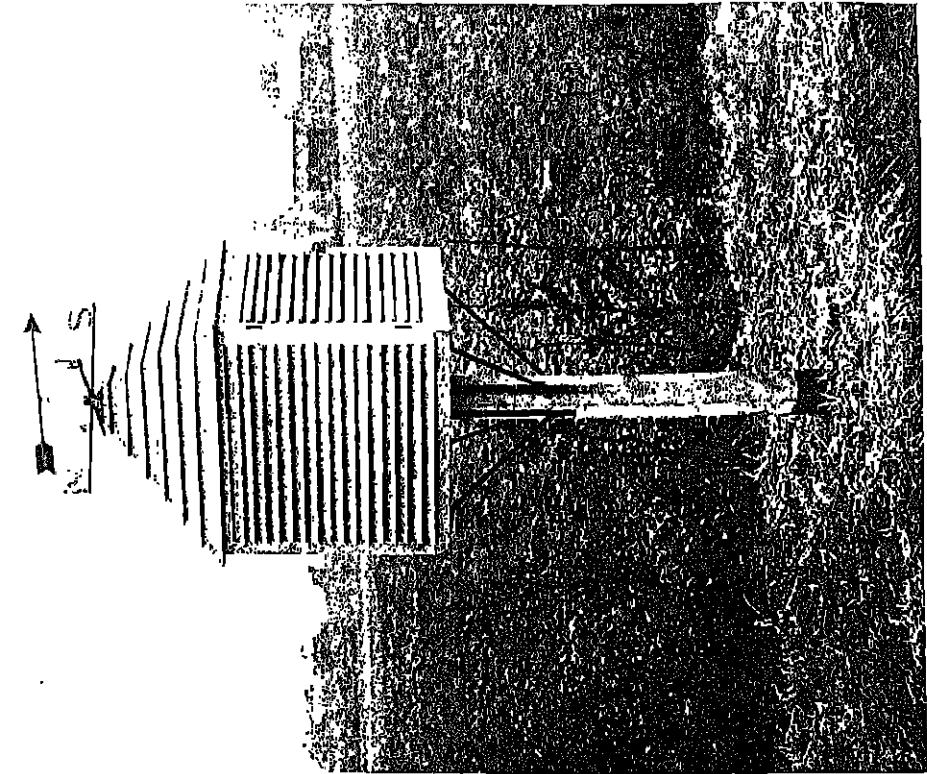
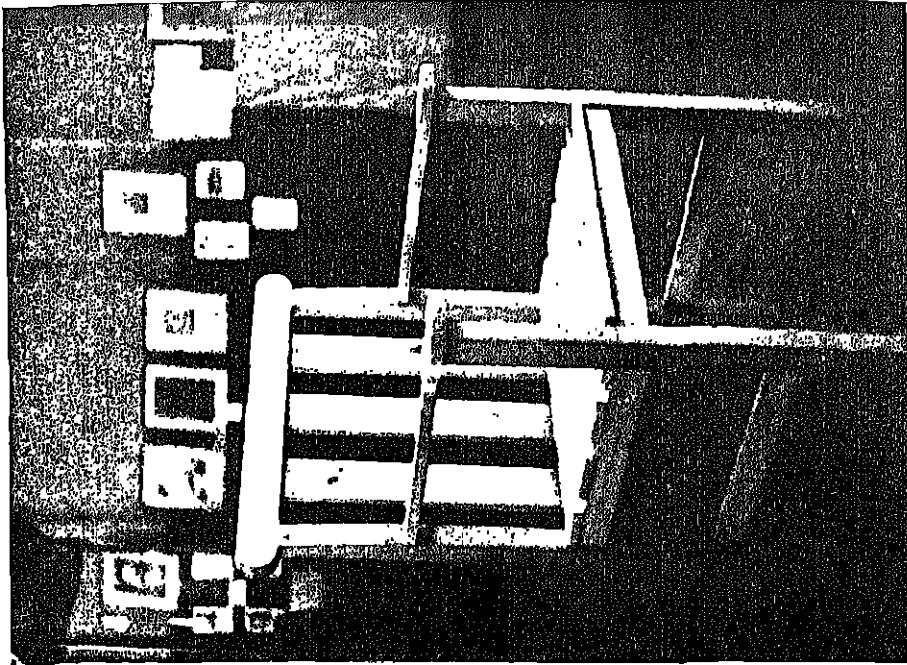


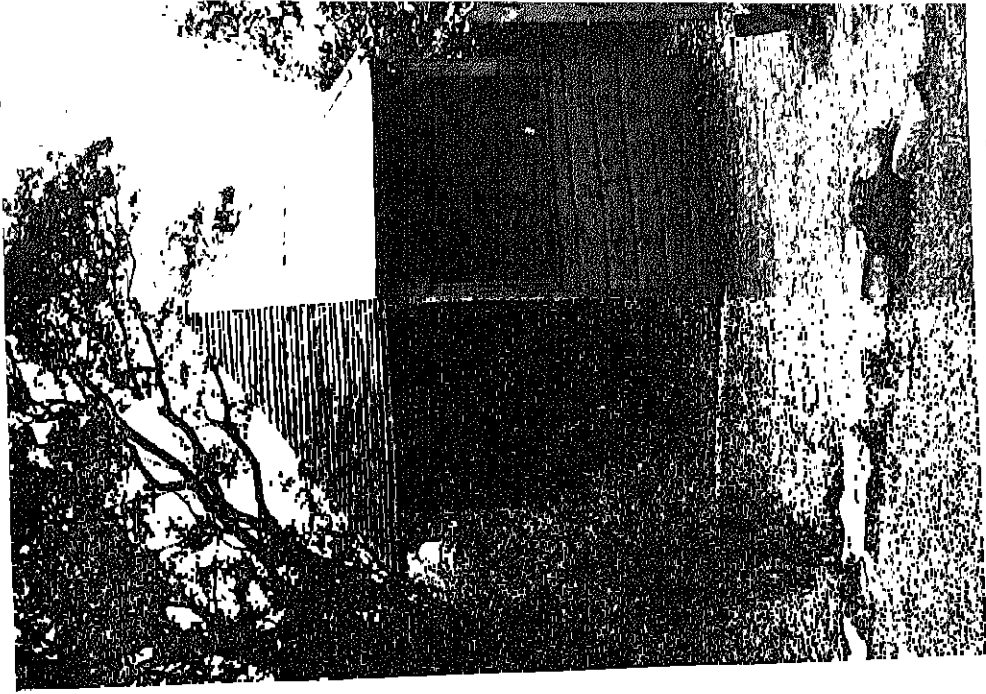
FIG. 101. WEATHER STATION



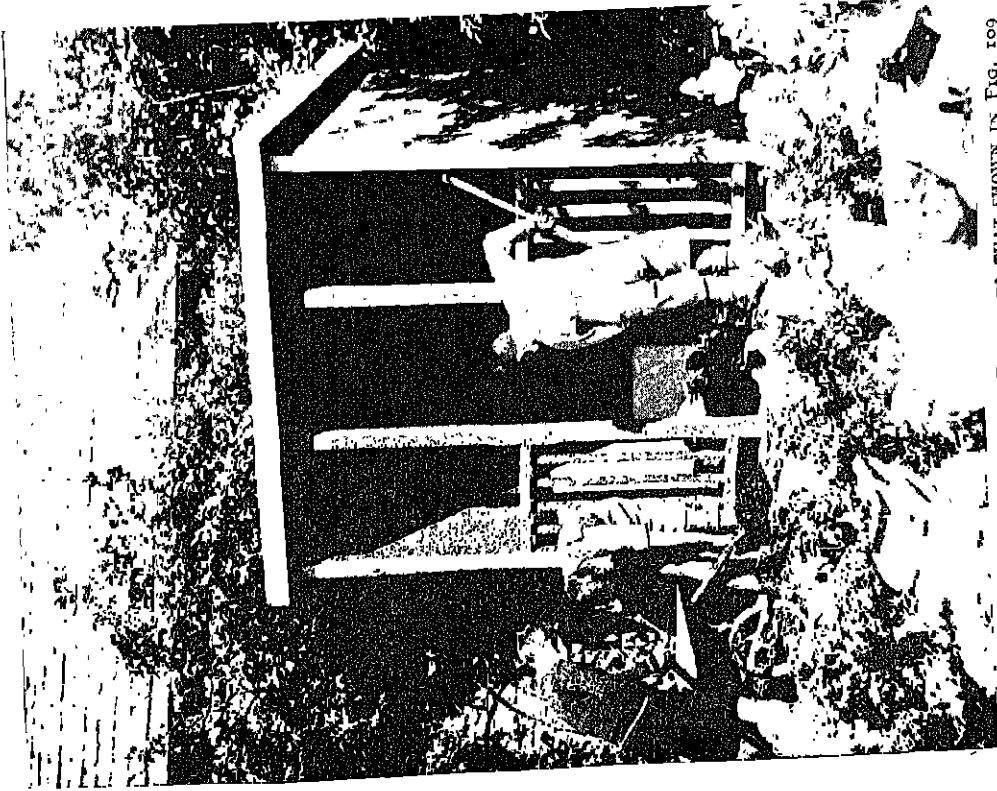
ALTERNATIVE DESIGN FOR A WEATHER STATION TO THAT SHOWN IN FIG. 101.
THE PIVOTED WIND VANE WAS MADE IN THE METALWORK SHOP OF THE SCHOOL



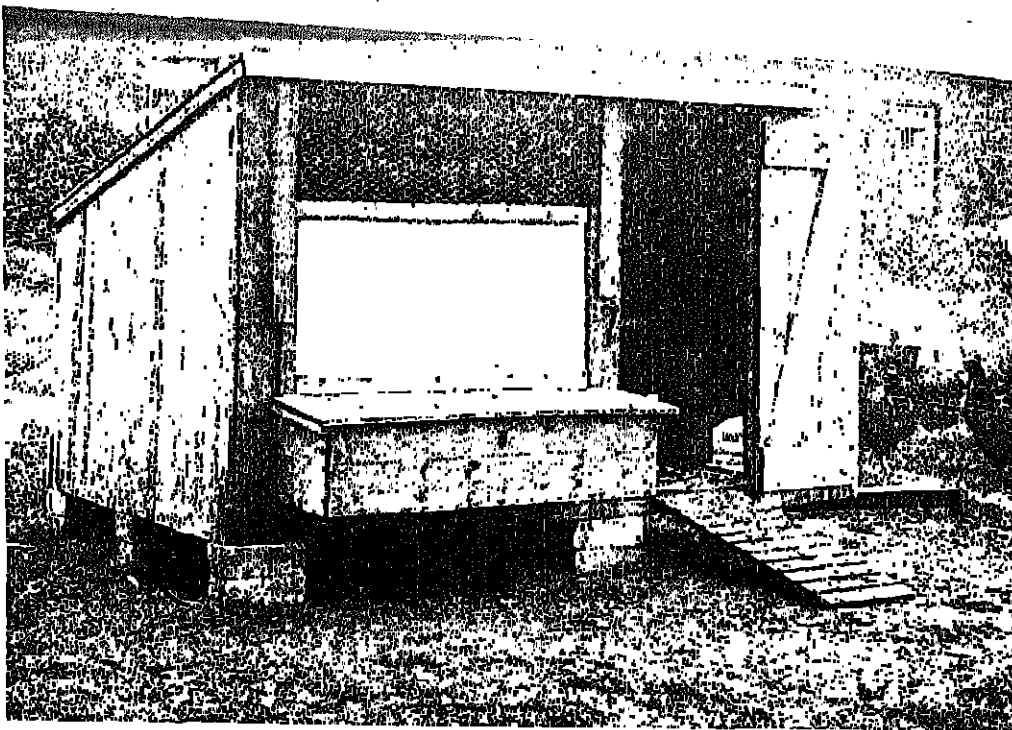
GARDEN SEAT IN DEAL



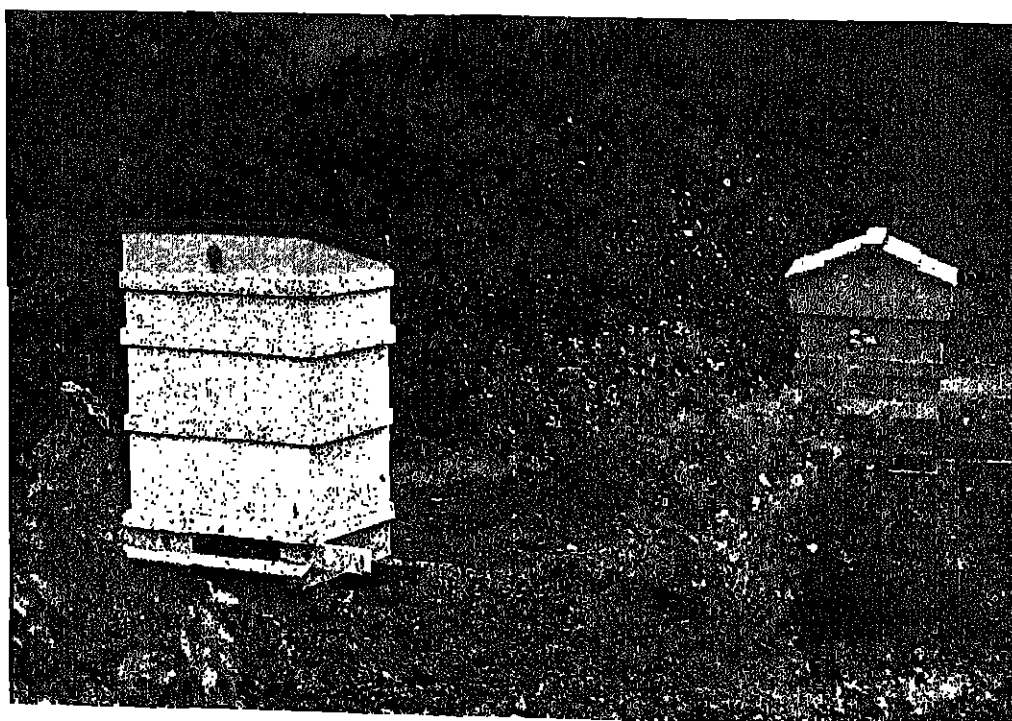
HEXAGONAL SUMMERHOUSE BUILT IN SCHOOL



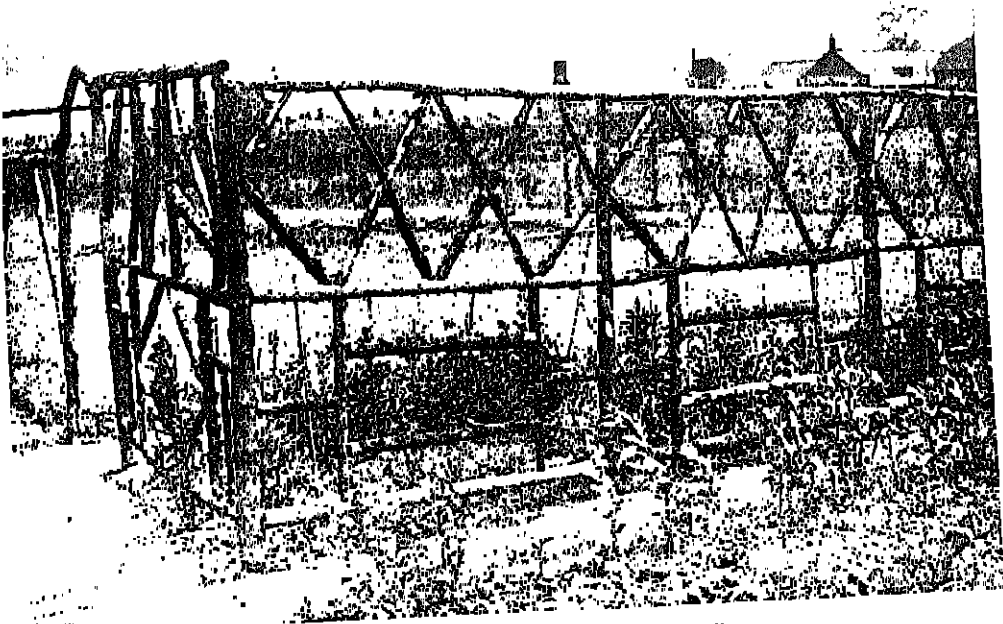
GARDEN SHELTER OF ALTERNATIVE DESIGN TO THAT SHOWN IN FIG. 109



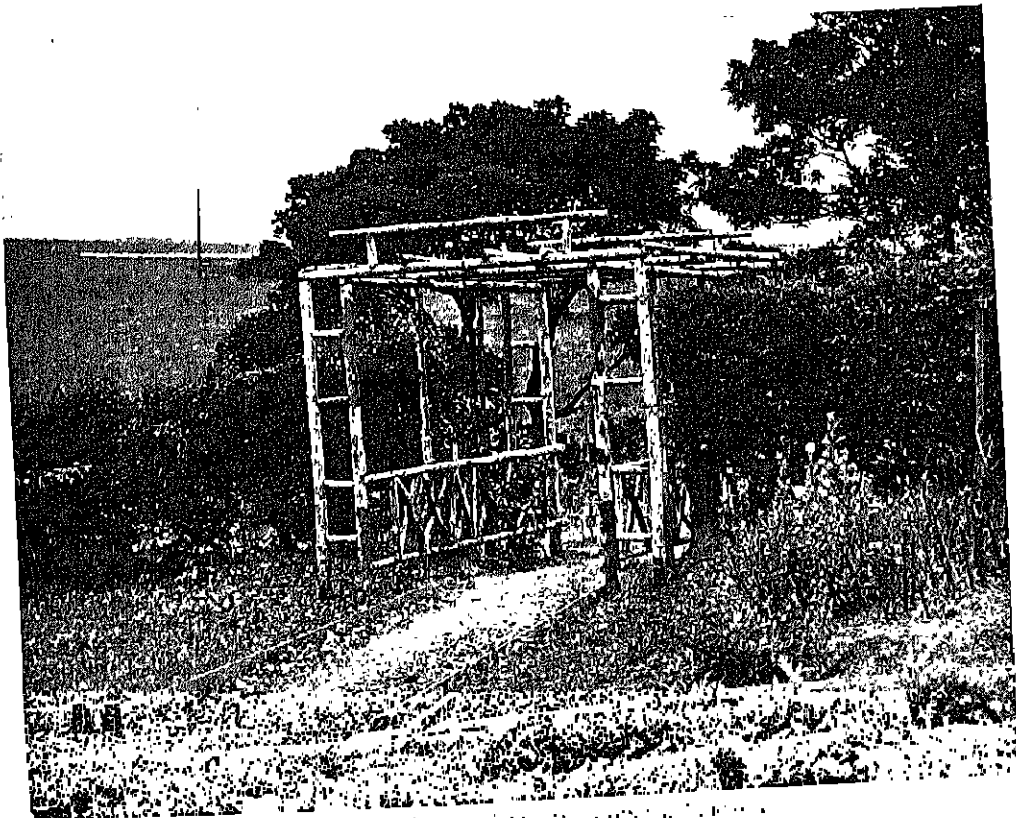
POULTRY UNIT INVOLVING THE SAME CONSTRUCTIONAL PRINCIPLES AS THE KENNEL



NATIONAL HIVE AND A GABLED HIVE IN A SCHOOL GARDEN



SCREEN OF LARCH POLES IN A SENIOR SCHOOL GARDEN



SCREEN OF LARCH POLES INCLUDING A TRELLIS

Deal timber is used throughout for this job. According to the ports of shipment and the part of this country in which it is bought, it is called "red" or "yellow" deal. The only finish it requires is a coat of green or brown Solignum, which is an excellent wood preservative. Alternatively, it may be given one priming coat of paint and one or more finishing coats of flat paint.

The main framing is mortise and tenoned together, as shown by the enlarged detail sketch, the top rails acting as wall plates for the miniature roof. This is built with rafters and ridge-piece in the normal way, and is finished with tongued and grooved boarding, and finally with roofing felt.

The two side frames are joined first, and the mortises and tenons are cut for the ends on the corner posts. Then the housings are cut for the louvres in the sides and also on the posts for the ends. The whole framework is fitted-up dry, and when correct it is taken apart and the side frames and louvres are glued up.

Later, the end rails and louvres on one end are glued up to complete the framework. One end is left without louvres for a door to be fitted, or the door may be fitted in one of the sides if that is preferred. If the latter is the case, then the two ends would be glued up first of all complete with their louvres.

The inner face of the bottom rail has been grooved to take the tongued baseboard, which is not glued into place but is fitted in dry when the framework is glued up finally.

Next, the sloped or weathered sill may be fitted. This is put in in sections from the outside and is merely nailed in position, as the rail behind it is jointed into the posts.

The roof is built and finished, after which the door is framed up with mortise and tenon joints, and is also fitted with louvres. The joints in the door are the plain, through mortise and tenon joints, shouldered all round and wedged on the outside. The bottom rail should be weathered as shown in the detail diagram, to fit over the bottom rail of the framing, and a fillet stop should be fitted on the inner edge of the left-hand post for the door to close on.

The stand is quite straightforward in its construction and does not require any detailed description. The station is best fitted to the stand by the use of metal brackets, as indicated in the half-sectional end view, Fig. 101.

As the whole job is heavy and is standing on four legs, it is best to bed each end of the stand legs on to a section of flagstone, which is let into the ground for about 6 in. Each leg should then be cemented in securely up to the ground level, the top surface of the cement block being sloped away from the leg all round to prevent water from standing in contact with the stand feet and rotting them.

On page 470 is shown a design for a weather station alternative to that shown in Fig. 101.

GARDEN SEAT.—A small garden seat of simple construction, made in deal, is shown in Fig. 102 and on page 470. By adding a centre back leg, a centre front leg under the front seat rail, and two stretchers in the front, the width can be extended to 5 ft. or more.

Stopped and square-shouldered mortise and tenon joints are used for all the framing members. Stub-tenons are used on the back slats, and large square stub-tenons with narrow shoulders are left on the tops of the front legs for the joints with the arm rests.

The back and seat slats and the arm rests are all made of $\frac{3}{4}$ in. deal battens, from which the tongues and grooves have been planed off.

An alternative arrangement for seating is shown in one diagram, in which the side seat rails are shaped on the top edges. The front rail is straight in its length, but it has the top edge slightly rounded. The curve is carried on to the front, as illustrated, by planting a thicker piece of stuff on to the front of the seat rail.

The seat slats in this case are narrow and almost square in section, and they have their upper edges slightly rounded off. If any timber other than deal is available, these slats may be made of teak, oak or ash, for great strength in view of their narrowness.

A deal chair should be painted white, green or brown. Chairs and benches which are made of oak or teak should not be painted; instead they should be well oiled with boiled linseed oil which is rubbed into the surface of the wood as thoroughly as possible. The oil is a great preservative and gives a more durable finish than does wax for any better class exterior work. At the same time oil brings out the full beauty of colour and figure which the hardwood may possess.

If there is any objection to the deal chair being painted, then green or brown Solignum should be used. It serves both as a stain and as a preservative for outdoor work. For rustic seats, peeled oak is preferable to larch.

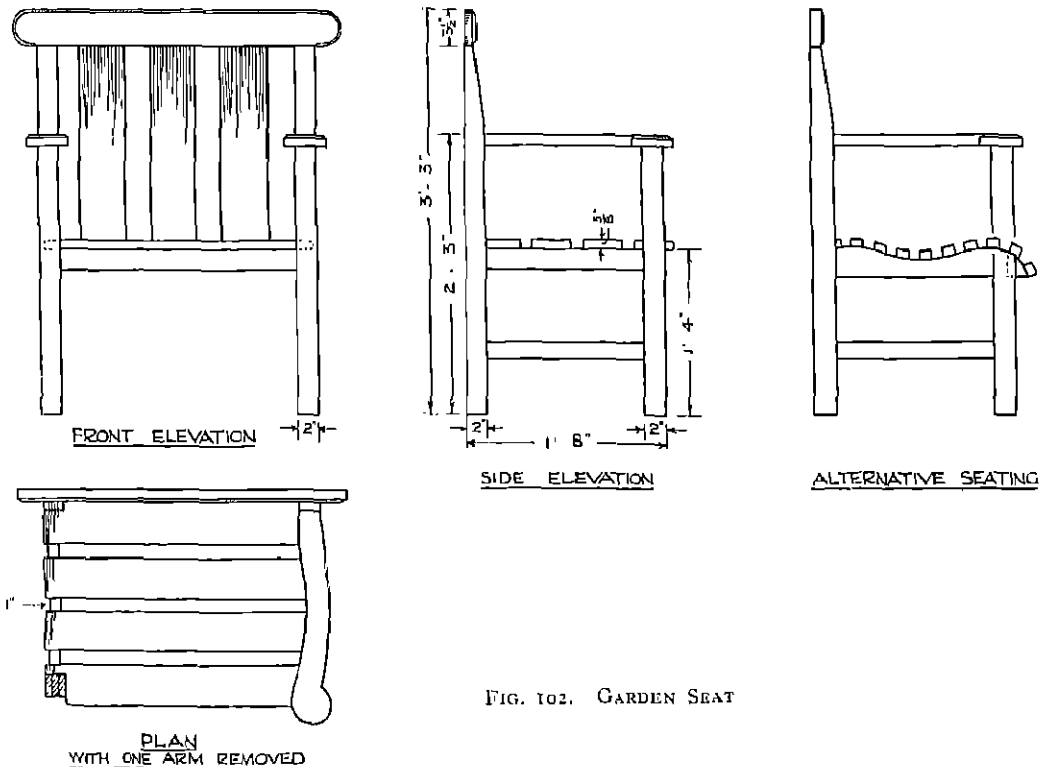


FIG. 102. GARDEN SEAT

KENNEL.—As shown in Fig. 103, this is made upon the same principle as a portable hut having a lean-to type of roof, and will serve, therefore, to illustrate several points which would occur in larger huts. Although it is only 5 ft. by 3 ft. by 4 ft. over-all sizes, it embodies nearly all the constructions necessary for the larger shelter shown in Fig. 109.

The portable system of construction gives much greater strength to small buildings than is possible with a fixed framework. In addition, the portable hut has the advantage of being built in sections, enabling it to be dismantled at short notice and re-erected somewhere else without damage to any of the parts.

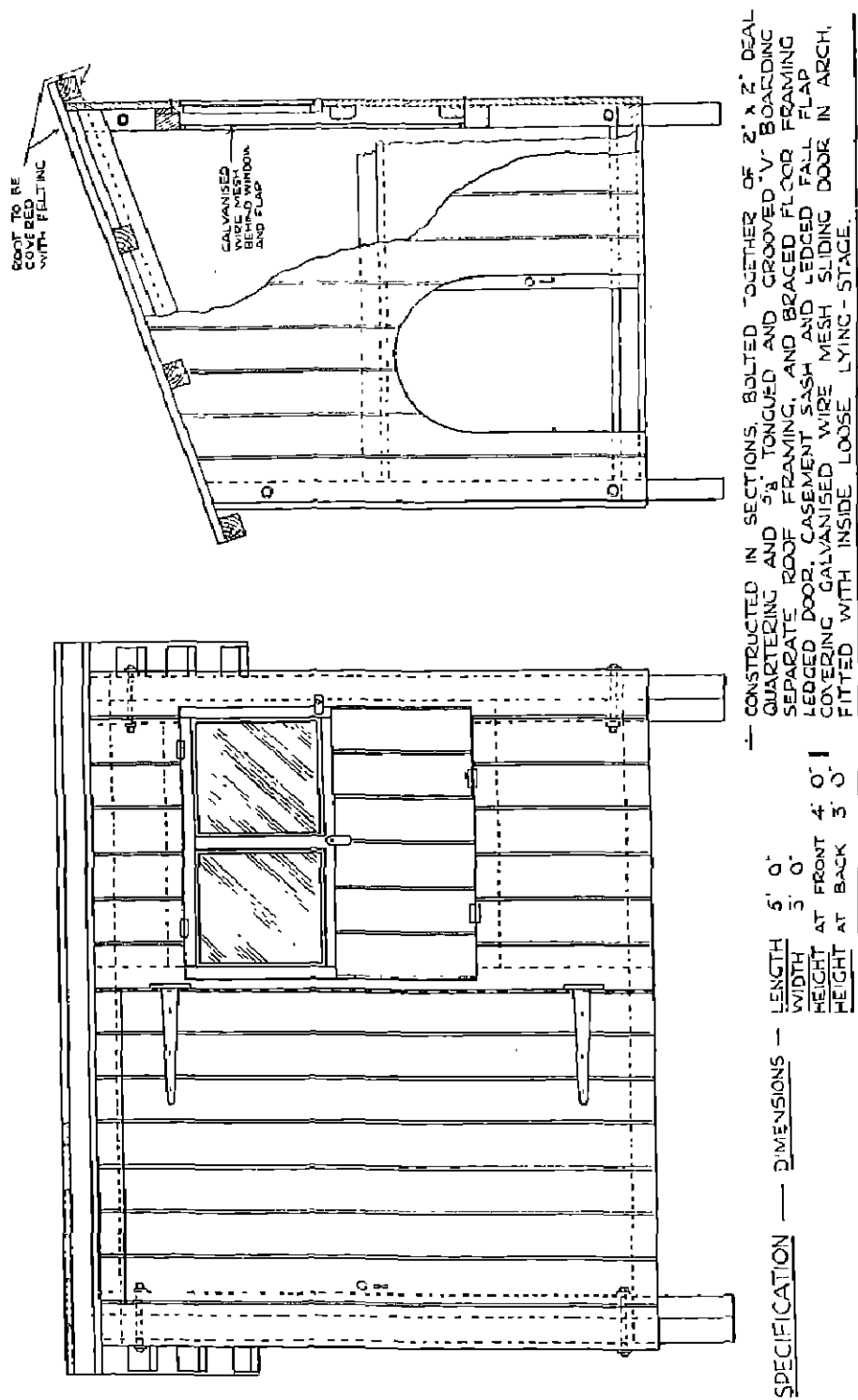


FIG. 303. KENNEL

The kennel shown in the diagrams is built in this manner. All four sides are framed up separately, and are boarded on the outside before being bolted together. The roof is made as a unit to drop into place and be screwed home. The floor is a braced framework covered with tongued and grooved boards, which is screwed into place as a unit.

2 in. by 2 in. deal quartering is used for the main framing, in which mortise and tenon joints occur at the junctions between middle rails, posts and sills. The head rails are halved across the posts. The frames are covered with $\frac{5}{8}$ in. tongued and grooved V-boarding, including the roof and the floor. The roof boarding is carried on two edge battens and two purlins, to which it is nailed, the purlins being notched over the head rails of the two end framings, as shown in the diagram. These notchings help to hold the roof in position, and additional security is given by two 2 in. by 2 in. guides, which are halved across the purlins so that they lie just inside the head rails, one at each end of the roof.

Three lengths of 2 in. by 2 in. stuff carry the floor boarding. They run from end to end and are notched into the two end sills, so that when the bottom flooring is dropped into place, the boarding overlaps the sills at their inner edges. The two outer battens are then screwed to the sills of the front and back frames.

The sill at the left-hand end of the kennel is set in from the post faces by 1 in., and a sliding door is fitted to cover the entry arch. The top guide for this door is formed by a length of rebated 2 in. by 2 in. stuff which is nailed to the boarding, as shown. The door is made of the same boarding ledged on the inside, and is secured by a hasp when it is closed.

On the front of the kennel is fitted a large door, which takes up just over half of the available width. This door is ledged and braced on the inside and is hung on strap hinges. The remaining portion of the front includes a two-light casement sash to open outwards and upwards, and a ledged fall-flap for ventilating purposes. These are held in place by buttons when it is desired to keep them closed.

Behind the casement sash and the fall-flap, the whole of the panel covered by them is filled with a single thickness of galvanised wire mesh, which is stretched across the opening and held in place by a metal fillet which is screwed to the framing.

Both the casement and the fall-flap are carried on intervening rails in the framing, shown by dotted lines in Fig. 103.

Before bolting the parts together, it is advisable to give each separate framing a good dressing with Solignum. All the bolts and nuts should be greased thoroughly with vaseline, tallow or thick gear-oil. Unless the bolts are galvanised, oak posts should be avoided for bolted work, owing to the action of the gallic acid which they contain. A simple lying stage may be made to suit individual needs and may be put in separately through the side door.

On page 472 is shown a poultry unit involving the same constructional principles as the kennel.

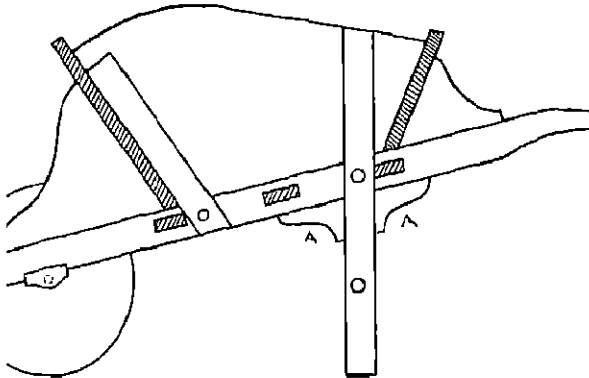
GARDEN WHEELBARROW.—One of the most necessary articles for the school grounds is a strong wheelbarrow, Fig. 104. It is a valuable exercise in itself, and one which may be varied in detail from time to time.

Wooden wheels, however, are not as a rule very satisfactory when they are home-made, and this detail of the barrow—along with its spindle boxes—should be bought outside. These fittings can be purchased from the South London Wheel Works, at 61, New Kent Road, London, S.E.1.

The shafts should be made of ash or oak, and the floor, sides and legs of elm. The latter is not easy to work, however, and a satisfactory job may be made of the barrow if red deal is used instead.

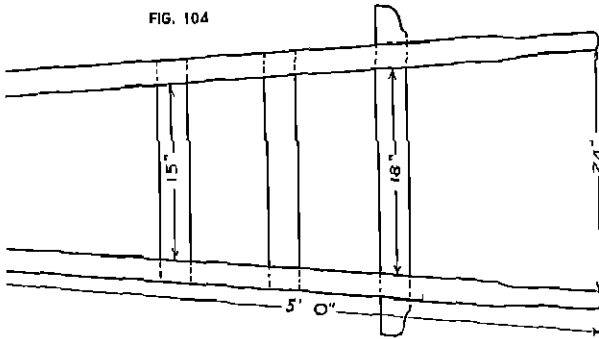
It is advisable to get the wheel (with a $\frac{1}{2}$ in. spindle) and the spindle boxes first, so that the shafts may be framed up to suit these items. Stuff 3 in. by 2 in. should be used for the shafts, with 3 in. by $1\frac{1}{4}$ in. for the rails, as in Fig. 105. The sides are made of 1 in. stuff (dressed to $\frac{7}{8}$ in.) if deal is used, or of $\frac{3}{4}$ in. stuff if hardwood is available.

The sides should be grooved (housed) into the ends for $\frac{3}{8}$ in. depth. They are also screwed to the legs and to the forward supports, which in turn are bolted to the under framing. $\frac{1}{2}$ in.



SIDE VIEW

FIG. 104



SHAFTS AND RAILS

FIG. 105

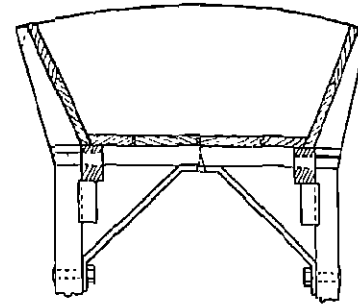
COMPOSITE SECTIONAL
VIEW OF BACK

FIG. 106

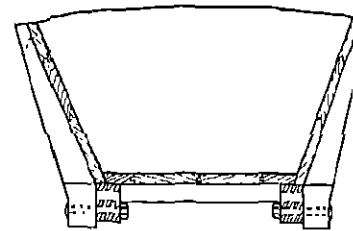
COMPOSITE SECTIONAL
VIEW OF FRONT

FIG. 107

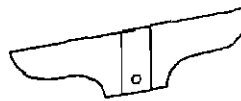
ELEVATION AND PLAN
OF BRACE A, UNDER SHAFT

FIG. 108

GARDEN WHEELBARROW

diameter bolts will be suitable and, in addition, a strut of $\frac{1}{2}$ in. round iron rod, with the centre and ends flattened and drilled for screwing, is fitted between the legs and to the cross rail of the framing.

The legs are $2\frac{1}{2}$ in. square section, but will have to be cut from wider stuff to allow of the upper part, or side support, being raked at the angle of slope of the sides. 6 in. by $2\frac{1}{2}$ in. stuff would provide the width necessary for this to be done.

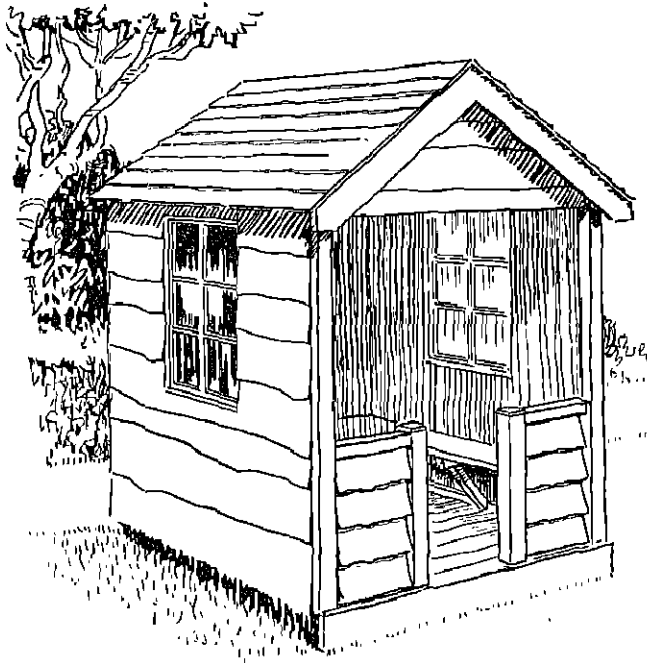
The floor boarding rests upon the cross rails of the shaft framing, and these may be either

mortised in flush with the top edge of the shafts, as shown, so that the floor fits between the sides, or they may be mortised into the shafts so that the floor fits in between the shafts themselves, but still rests upon the cross rails.

If it is not possible to box the ends of the wheel spindle, bearers may be cut, bored and fitted to the underside of the shaft in place of the boxes. The spindle will then have to be longer and it will be threaded at each end to take both a tightening nut and a locking nut. A washer must be inserted between the bearer and the nuts at each end.

Tongued and grooved boarding is used for the sides and the floor, and if the barrow is to be painted, all joints should be treated with red lead before assembly. One coat of this quality paint should then be given, followed by finishing coats of white lead paint, to the last of which may be added a little hard-drying varnish. For ordinary rough work it is sufficient if the parts are soaked in creosote before their final assembly.

GARDEN SHELTER.—The detail shown in Fig. 110 is for a permanent building such as a fixed shelter, or a larger sports pavilion. The corner posts and framing sills are of 3 in. by 3 in. stuff, whilst the rails, plates, studs and rafters are of 3 in. by 2 in. stuff. No new joints are introduced, as the various members are either plain butted and nailed, or halved, or notched together, and these details will depend upon the amount of time available for the job, or upon the capabilities of the particular group of boys engaged upon it.



BUILT OF DEAL FRAMING.
OUTSIDE FINISHED WITH
WANEY ELM BOARDS.
INSIDE LINED MATCHING.
ROOFED WITH CEDAR SHINGLES.
FITTED WITH SEAT ROUND THREE SIDES.

FRAMING. 3" x 2" PLANED RED DEAL.
3" x 3" CORNER POSTS.
WALL LININGS. 1/8" TONGUED AND GROOVED MATCHING.
ROOF SHINGLES ON BATTENS NAILED TO 3/4" TONGUED AND GROOVED BOARDS.
FLOOR 1/8" TONGUED AND GROOVED BOARDS

FIG. 109. GARDEN SHELTER

As the fixed type of building has not already been included in these suggestions, the construction is given in detail as it differs considerably from that of the portable hut, of which the dog kennel was an example. It is advisable, however, to use the portable method of construction whenever possible, as it is easier to erect, is stronger, and, in the long run, is cheaper and more convenient than the fixed method.

In Fig. 110 the corner posts and ground sills are made of 3 in. by 3 in. stuff. The other rails, plates, studs and rafters are made of 3 in. by 2 in. stuff. The roof and

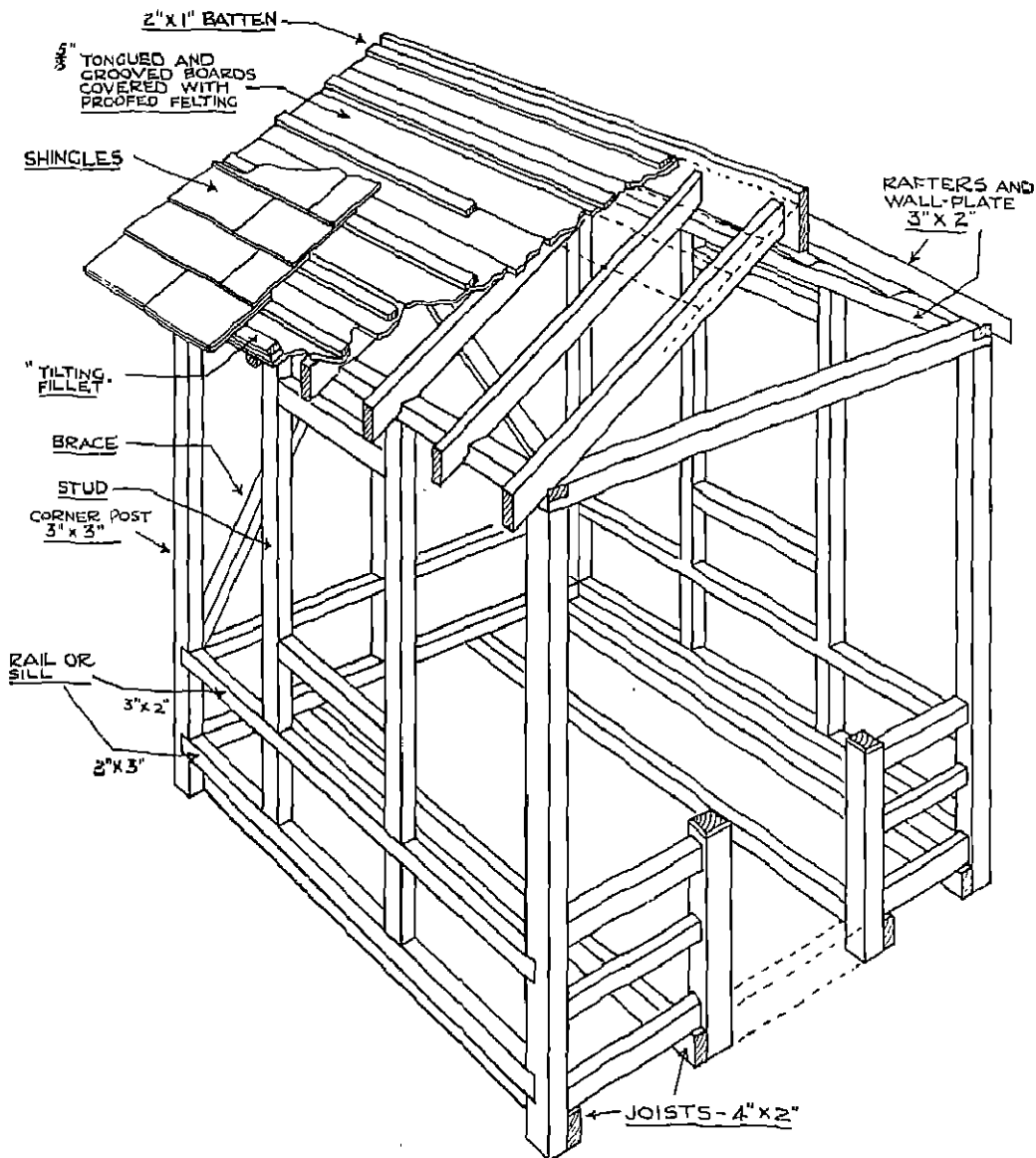


FIG. 110. DIAGRAM OF FRAMING OF FIXED SHELTER OR HUT—8 FT. BY 8 FT.

wall boarding is $\frac{1}{2}$ in. thick, tongued and grooved, and covered on the roof with proofed felting, over which the battens are nailed for the shingles or tiles.

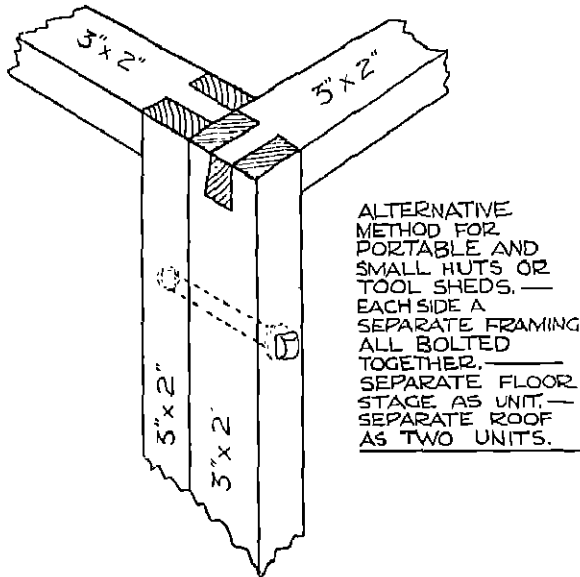
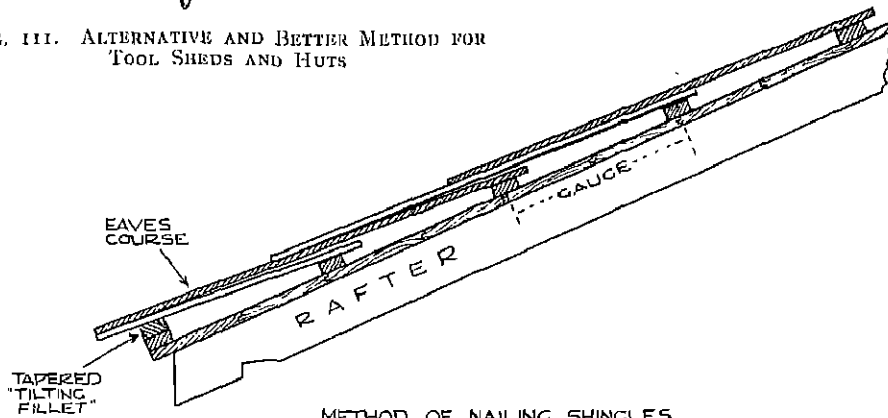


FIG. 111. ALTERNATIVE AND BETTER METHOD FOR TOOL SHEDS AND HUTS



METHOD OF NAILING SHINGLES — ALTERNATE ONES SHADED, TO SHOW CLEARLY THAT EACH SHINGLE OVERLAPS ALTERNATE BATTENS, AND IS THEREFORE TWICE THE GAUGE PLUS OVERHANG IN LENGTH. (EXCEPT LOWER ONE IN EAVES COURSE)

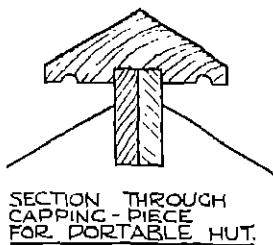


FIG. 112a. METHOD OF NAILING SHINGLES

The roof is very small, as the hut is only 8 ft. by 8 ft. in plan. No purlins or ties are necessary, so that the roof boarding may be nailed directly on to the rafters.

Cedar shingles are recommended as a decorative finish for the roof itself, although they are rather expensive. Fig. 112 shows the way in which they are nailed to the 2 in. by 1 in. battens, starting from the bottom, or "eaves course," and working upwards. The necessary slope for the first course is obtained by planting an extra length of batten on to the first one already fixed at the edge of the eaves, and by tapering it slightly in cross-section. The first shingle is cut

short, as shown in the diagram, but the upper one is of the full length. The distance from centre to centre of the battens is called the "gauge," and these battens are so arranged that each full shingle extends over twice the gauge plus the overhang at each end.

Battens must be put in as it is necessary to have an air space between the roof boarding and the actual roofing material if shingles, tiles or slates are used. Proofed felt may go directly on to the boarding, and this is advised as a protection for the boarding, even when shingles, etc., are used.

The portable construction.—In Fig. 111 it will be seen that the styles of the separate framings which constitute the side walls are bolted together in place of the single corner post. This method enables stronger joints to be used at the corners and does away with the separate wall plate.

The other members, such as studs, rails and sills, are jointed as is convenient, each side wall being a separate framing.

A span roof may be made in two sections. Each section has its own ridgepiece, rafters and wall plate, as a unit. When erected, the wall plate lies on top of the upper rail of the side framing already in place, and is bolted to it. The two ridgepieces come together and they also are bolted. A capping piece is then fitted above them to cover the join between the ridges and to extend a little way over the roof at each side.

The floor is built as a separate staging over which the framing of the hut fits in the same way as for the kennel described earlier.

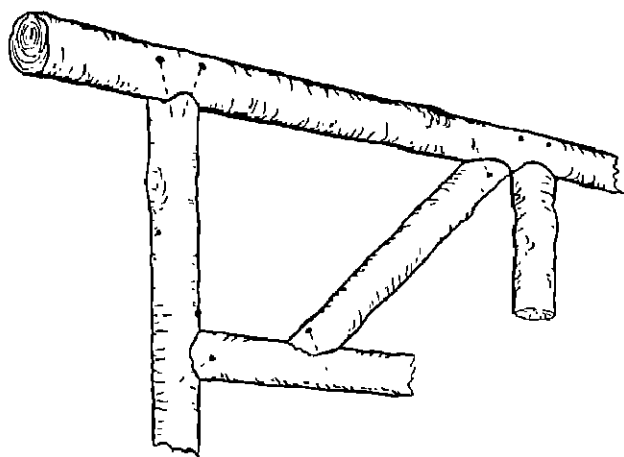
Both the fixed and the portable huts should be bedded on 4 in. by 2 in. joists, which in turn should either be resting upon a concrete base, or raised from the ground on a brick base. In each case there should be free access for air underneath the flooring. Shifting or wander-

ing of the hut from its base, due to wind pressure, will be prevented by carrying the corner posts down to the ground level.

If some form of bitumen roofing felt is used instead of shingles or tiles, it will be necessary to make this safe against weather conditions by adding stripping laths, which are nailed on from ridge to eaves, not horizontally, at intervals of about 2 ft.

The outside of the fixed building, and the outside and edges of the portable frames, may be given a coat of creosote or Solignum; or, a good priming coat of paint, followed by two coats of flat paint—to the last of which has been added a little hard-drying varnish—will give a satisfactory finish to the job.

On page 471 is shown a garden shelter of alternative design to that shown in Fig. 109.



SCREENS, ARCHES,
SEATS, ETC. IN
LARCH POLES
ENDS OF MEMBERS
NOTCHED TO FIT TO
MEETING POLES AS
SHOWN, THEN NAILED.

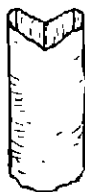


FIG. 112b

SCREENS.—Rose screens, arbours, fences, etc., are best made of trimmed larch poles, which as a rule, may be had from a local estate at a very reasonable price per foot run.

The construction of such screens is a simple matter, but a great improvement is made in their appearance if the ends of the abutting members are notched to receive the cross members, as shown in Fig. 112b. The only drawback to this method is the fact that water may collect, or be held, in these notches and so cause rotting at the ends of the poles. But as they are cheap and easily replaced, it is worth the risk for in any case they will last a long time.

The diagram shows how the nailing should be done, but boys should not be allowed to use too many nails on work of this type. Two nails to each joint should be ample.

A convenient size for this kind of work is a pole which is 8 ft. to 9 ft. in length, having a 4 in. butt. There is no point in using heavy butts, except as single poles for climbers. Archways should be 5 ft. to 6 ft. wide, and the poles should be placed clear of pathways by 18 in.

All vertical butts should be thoroughly creosoted to 6 in. above the ground level, and should be sunk into the ground for 18 in. to 2 ft. Alternatively, they should be peeled of their bark and dipped in copper sulphate.

The poles should be peeled of their bark before fitting-up, as this will flake off very quickly in any case, attractive though it looks when the poles are "green."

Screens of larch poles are illustrated on page 483.

BIRD SHELTERS.—The making of bird houses and shelters is one of the most interesting parts of the outdoor woodwork scheme. A great variety is possible in construction and design, and one of the simplest and most attractive types is shown in Fig. 113.

Fig. 114 gives the separate details of a simple construction, combining the use of deal

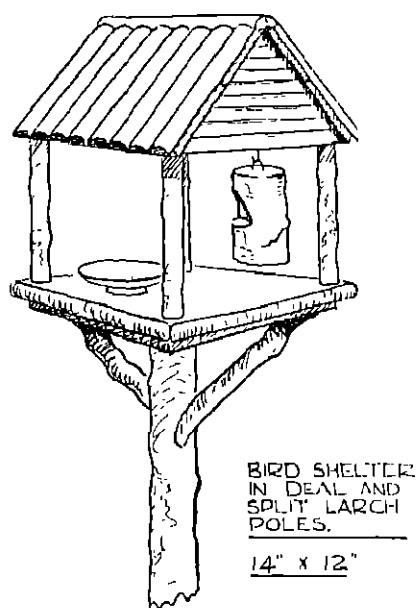


FIG. 113

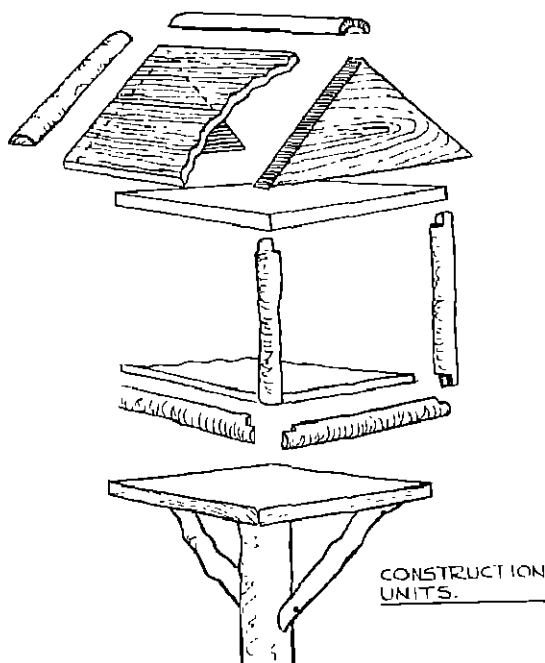


FIG. 114

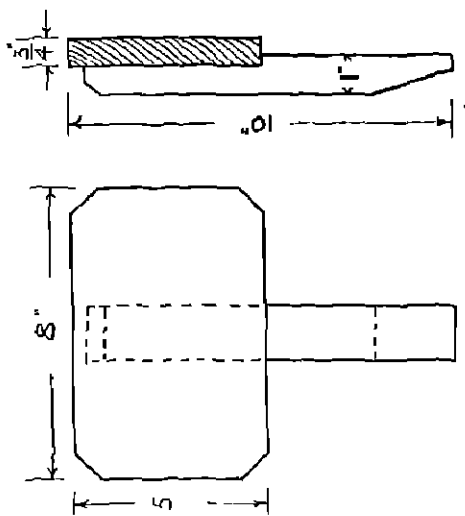
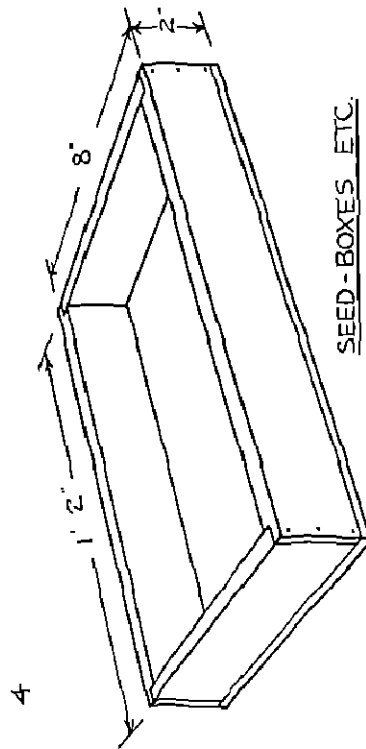


FIG. 115

1.

LABEL



SEED-BOXES, ETC.

FIG. 118

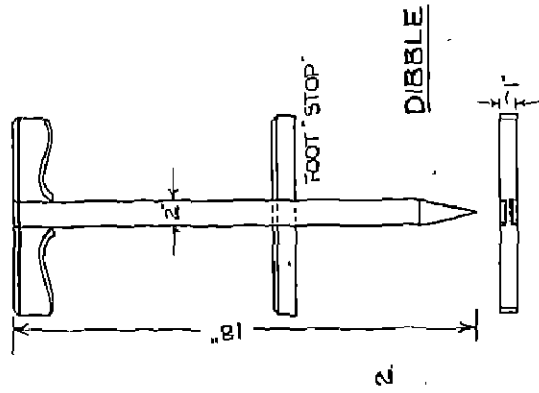


FIG. 116

2.

DIBBLE



PEA-GUARD
ON LIGHT WOOD
FRAMES OF 1 1/4" x 3"
3/4" WIRE MESH NETTING.

FIG. 117

3/4" WIRE MESH NETTING.
6" HIGH

3.

VARIOUS SMALL PROJECTS

boarding with split larch poles. A 4 in. butt serves as the post, to which a base board is securely nailed and is steadied by two bracing members. The shelter is built of boarding, and light, solid poles, after which the roof is covered with split poles, sawn into short lengths.

The shelter is attached to the lower baseboard by nailing up through the latter into the base of the shelter itself.

A hook, to carry a nut feeder as shown, is screwed up into the ceiling board.

If cats are about, it will be found that they will run up the post and use the shelter as a sleeping platform, driving away the birds. To prevent this, a circle of wire netting may be cut from circumference to centre at one point, bent round the post, wired together again, and bent outwards at the top to a funnel shape, with the edge turned slightly downwards. This will prevent such raids on the shelter.

VARIOUS SMALL PROJECTS.—There are a number of smaller projects, such as those shown in Figs. 115, 116, 117 and 118, which may be carried out at odd times when other work is held up. These do not need detailed explanation, beyond that provided by the diagrams.

NATIONAL SINGLE WALLED BEEHIVE.—This type of hive has been found to be the simplest to construct, with the added advantage of comparative cheapness, and it is the hive recommended for standardisation by the Ministry of Agriculture and Fisheries. These points make it a suitable pattern for adoption by schools.

The interchangeability of parts is one of the greatest advantages possessed by the National hive, and this, combined with the cheapness of its production, has made it a commercial success. These facts ensure that the training received in making and using a National hive will not be done on obsolete lines.

Fig. 119 shows the parts of such a hive in position for assembly. The individual parts are as follows:

Fig. 120 is a reversible floor board, with entrance block.

Fig. 121 is a stand for the hive, with alighting board.

Fig. 122 is a deep-frame box, or broodchamber.

Fig. 123 is a super or shallow-frame box, or section rack, either of which may be interchanged with a deep-frame box.

Fig. 124 is a crown board.

Fig. 125 is a shallow roof.

Other fittings such as frames are not included here, as they are tedious to make to the required accuracy. They may be bought along with the necessary metal runner and spacers. Eleven frames will be needed for each box, or super, of the standard type, either deep or shallow according to the box in which they are fitted.

If sections are fitted to the section rack, shown in Fig. 123, and fitting flush on to the part below, as in the case of the other supers, thirty-two sections will be needed, each $4\frac{1}{4}$ in. by $4\frac{1}{4}$ in.

The broodchamber fits flush on to the floor board at the sides and the back, the top surfaces of the frames being level with the top edges of the walls so that, in each frame box, the beeway is beneath the frames.

It is not customary for the top and bottom edges of the boxes to be rebated to keep them in alignment as the bees usually seal the joints and make them weatherproof. If, owing to prevalent high winds or other causes, it is desired to rebate these edges, due allowance must be made at both the top and the bottom of each super for the extra depth of side which will be necessary.

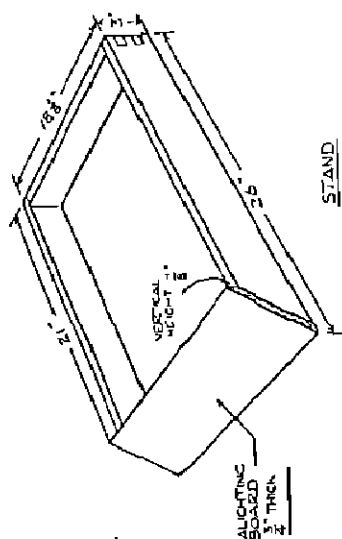


FIG. 121

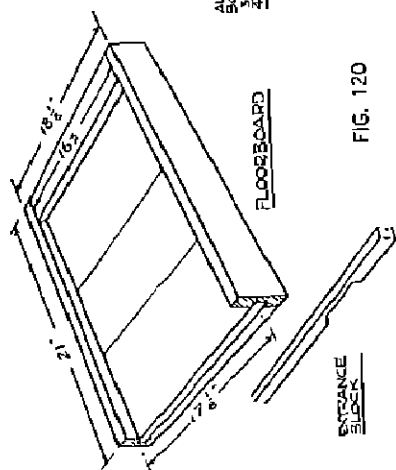


FIG. 120

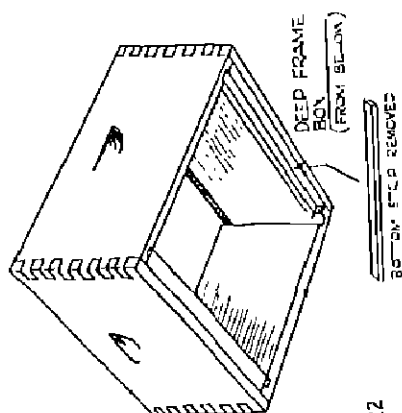


FIG. 122

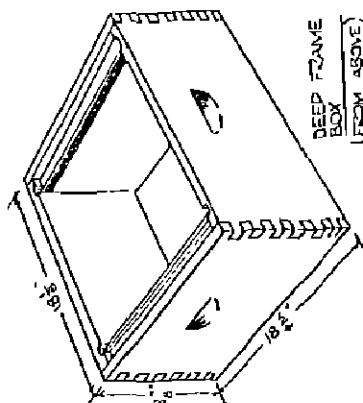
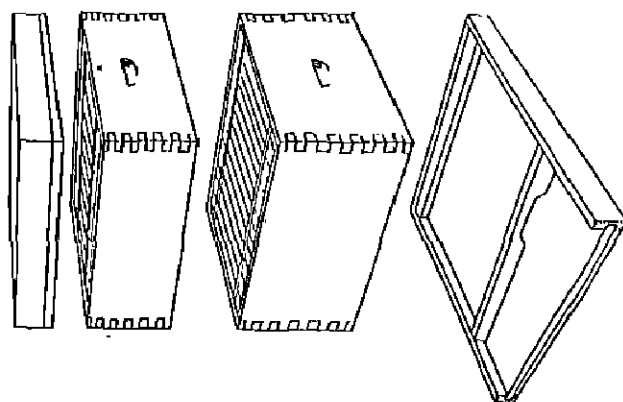


FIG. 119



BEEHIVES—THE NATIONAL SINGLE WALLED HIVE

Notes on construction.—The floor board is made of tongued and grooved boards. It is housed (across the grain) into the sides on a long slant, to give a depth of $\frac{3}{8}$ in. at the back and $\frac{7}{8}$ in. at the front, thus being reversible. The back filling strips are $1\frac{3}{4}$ in. wide by $\frac{3}{8}$ in. thick. The sides are secured by nailing to the floor board from the outside, and they are of $\frac{3}{8}$ in. finished thickness.

The deep-frame box is made of $\frac{3}{4}$ in. finished stuff, through-dovetailed at the corners. It is $8\frac{7}{8}$ in. deep, unless rebated. The spacing pieces for the inner walls are $16\frac{5}{8}$ in. by $\frac{5}{8}$ in. by $\frac{7}{8}$ in., and the lower one should be level with the bottom edge of the inner wall, both being exactly $\frac{1}{4}$ in. from the bottom edge of the outer wall. The inner walls are made of $\frac{7}{16}$ in. finished stuff and they are housed into the box sides. They are secured in position, and to the spacing pieces, by nailing. The metal runners should be set so that their top edges are $\frac{7}{16}$ in. below the top edges of the outer walls of the box.

The shallow-frame box, or shallow super, is the same as the deep frame-box in all details with the exception of its depth, which is $5\frac{3}{4}$ in. if it is flush-fitting and is not rebated.

The section rack will be $4\frac{1}{2}$ in. deep if the walls are flush-fitting to the part below. The five cross slats supporting the sections also allow a $\frac{1}{4}$ in. beeway beneath them. These slats, or bearers, may be notched into the bottom edges of the walls, and they are separated by spacing pieces at one end which are $3\frac{1}{16}$ in. by $1\frac{1}{2}$ in. by $\frac{1}{4}$ in.

The crown or cover board should not be made of plywood as there is a danger of the cementing being loosened. The outer surface then would buckle, whereas it is most important that the $\frac{1}{4}$ in. beeway which is provided by the raised edges should be preserved

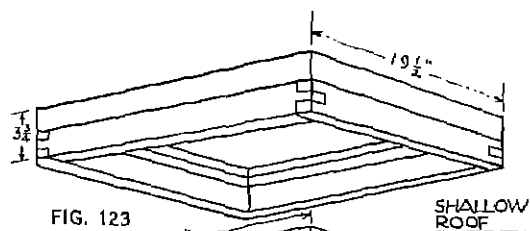


FIG. 123

SHALLOW ROOF



FIG. 124

CROWN BOARD

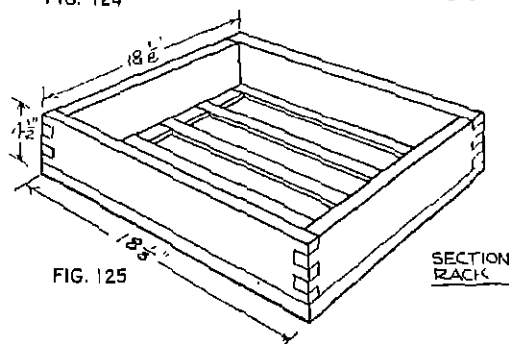


FIG. 125

SECTION RACK

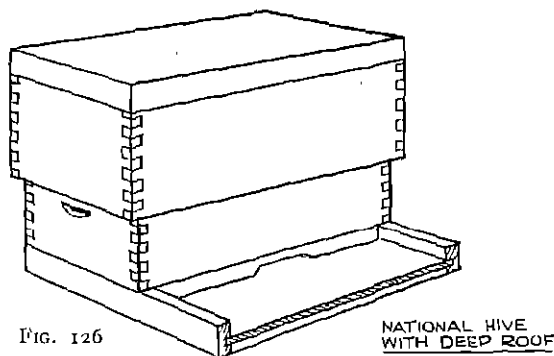


FIG. 126

NATIONAL HIVE WITH DEEP ROOF

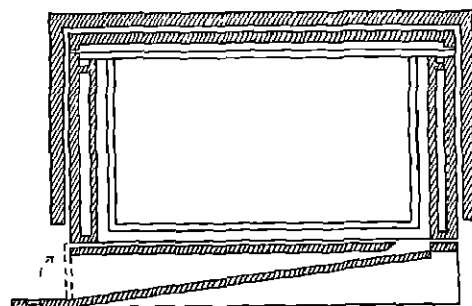


FIG. 127

SECTION THROUGH NATIONAL HIVE WITH DEEP COVER ROOF.

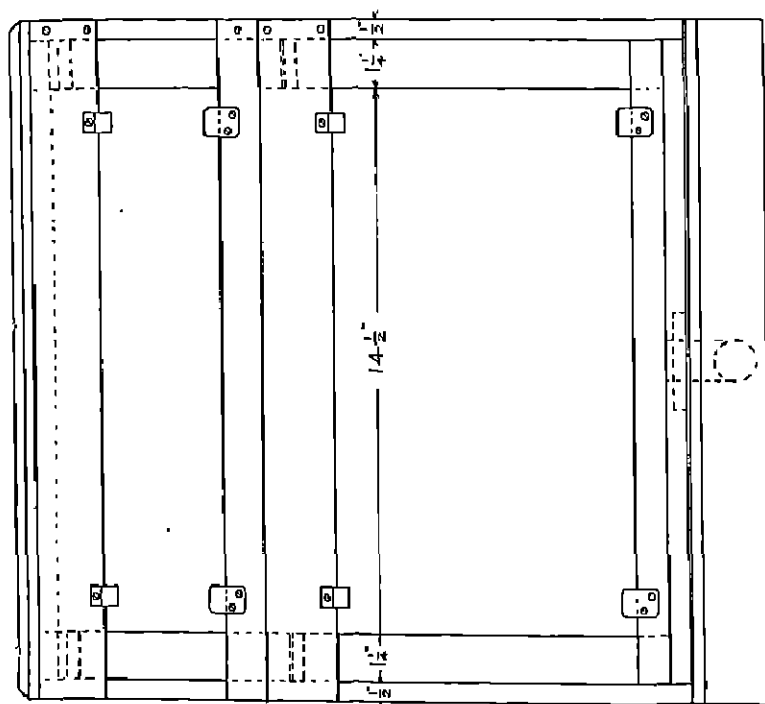
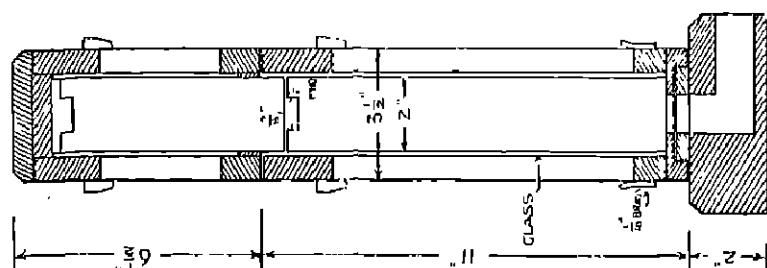
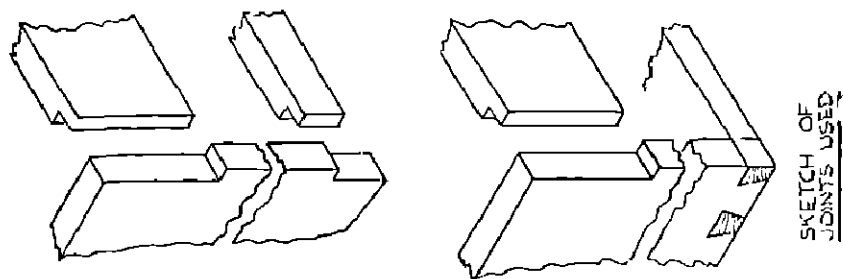
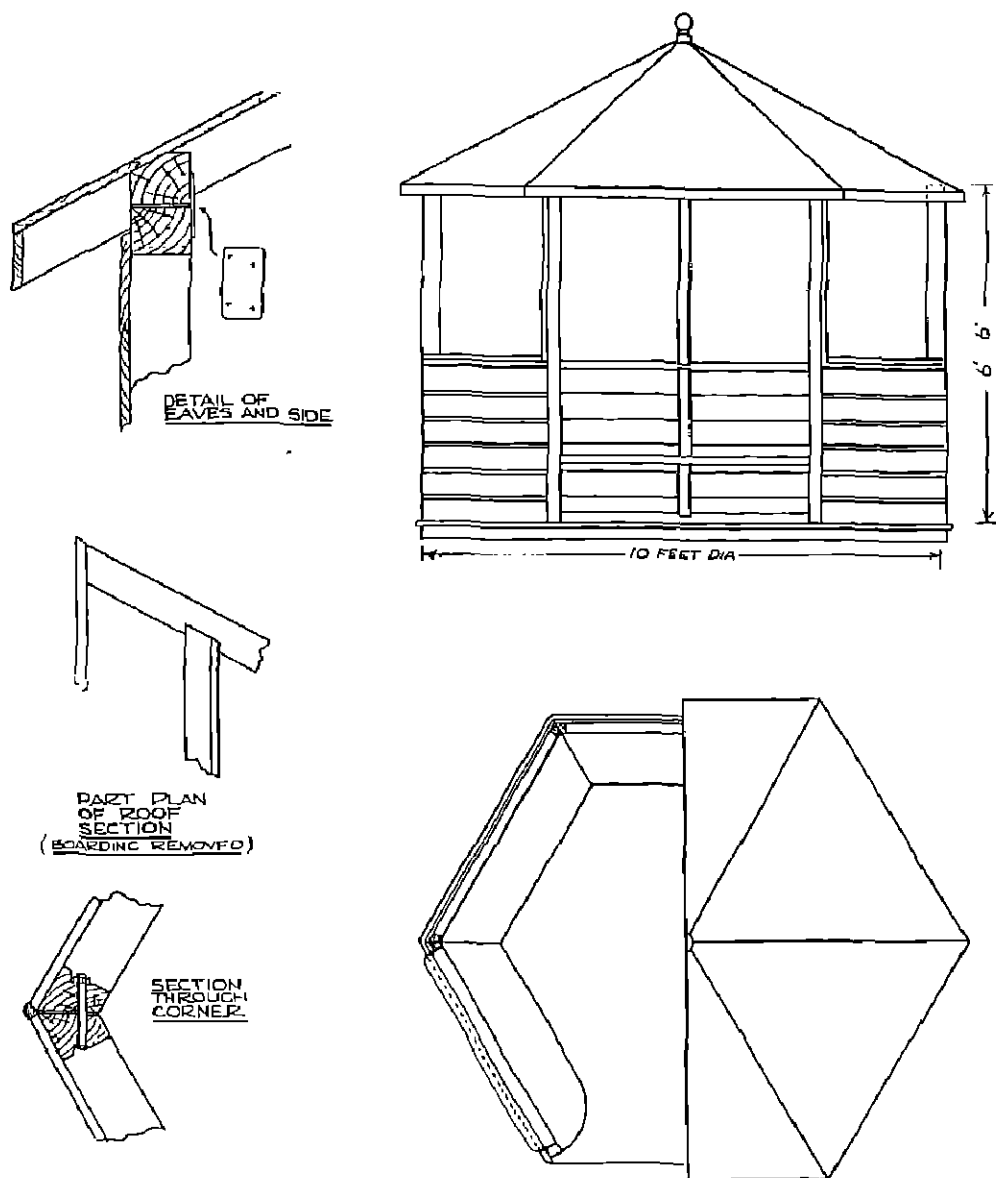


FIG. 118. OBSERVATION BEEHIVE

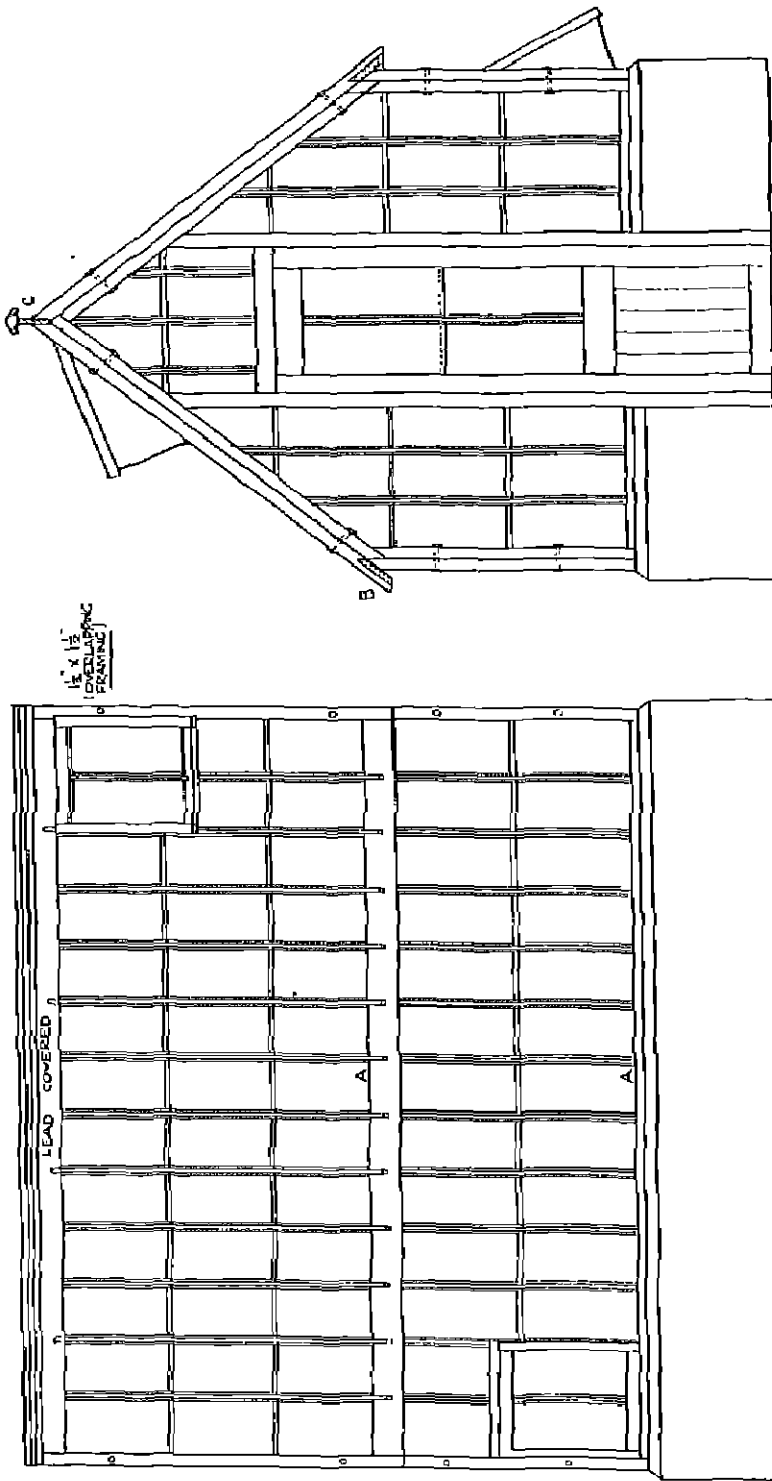
This is to take one standard and one shallow frame



SIDES AND ROOF BUILT IN SECTIONS,
AND BOLTED TOGETHER.

FRAMING	2" x 2"
SIDES	$\frac{3}{4}$ " WEATHERED FLOORING.
ROOF	$\frac{1}{2}$ " T. AND G. BOARDING.
FLOOR	$\frac{3}{8}$ " FLOORING.

FIG. 129. HEXAGONAL SUMMERHOUSE



FRONT ELEVATION

SIDE ELEVATION

FIG. 130a. SECTIONAL GREENHOUSE

on each side. The safest way of making this board is to obtain a well-seasoned piece of $\frac{3}{4}$ in. finished timber and to house it into the dovetailed sides. These sides will be $1\frac{1}{2}$ in. deep, which allows the necessary $\frac{1}{4}$ in. rise on each side of the board and gives the rigidity required to hold the board flat.

Dovetail joints are used again for the roof sides. The top boards are nailed on and these are covered with sheet metal or roofing material which is weatherproof. Four fillets, each $1\frac{1}{4}$ in. by $\frac{3}{4}$ in., are nailed inside as shown in the diagram.

Roof details vary greatly. The illustration shows a hive with a shallow sloping roof, and one with a deep gable roof, both of which are in use in a school garden.

Fig. 126 shows a deep roof which covers the joint between a packing super and the brood-chamber. This type may be preferred in districts which have an exceptionally heavy rainfall.

Fig. 127 gives a sectional view through a very compact hive with a deep covering roof which is suitable for transport and for use on the heather moors. It will be seen that the alighting board runs up underneath the hive to an entrance at the back, and that a ventilated inner cover is provided in this hive.

A National hive and a gabled hive are shown on page 472.

OBSERVATION BEEHIVE.—

The working drawings of an observation hive which is particularly useful for school purposes are given in Fig. 128. A number of such hives have been made and are in use in schools at the present time.

The doors are lined with soft felt. When they are closed, the hive is very compact and is readily portable, being disconnected from the lead-in at the base.

Mahogany should be used for a hive of this type which is to take its place as a piece of science apparatus, and the work should be accurately finished, and polished.

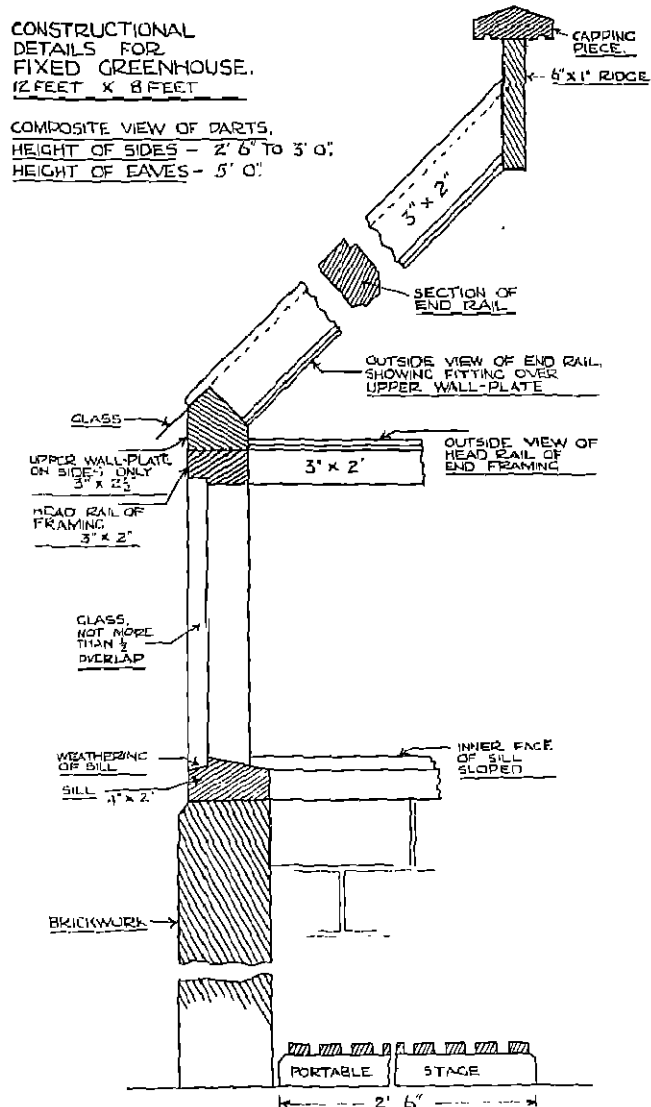


FIG. 131. CONSTRUCTIONAL DETAILS OF FIXED GREENHOUSE

HEXAGONAL SUMMERHOUSE.—The working drawings for the hexagonal summerhouse, which is shown on page 471, are given in Fig. 129.

It will be seen that the construction follows the lines already laid down for similar details, and the fact that the whole of this fairly ambitious project has been carried out successfully by boys of thirteen to fifteen years of age, in the one school concerned, shows that such a scheme as that which has been outlined here is not too advanced.

GREENHOUSE.—All constructional details are given in Figs. 130a, 130b and 131. The use of the double wall plate, seen in Fig. 131, along both sides of the fixed greenhouse, is strongly recommended as it makes a very sound structure. It will occur in any case in the portable type, as the frame units are bolted together.

Clean deal is used throughout, and all joints should be painted with a good priming coat before being assembled.

A greenhouse is shown on page 431.

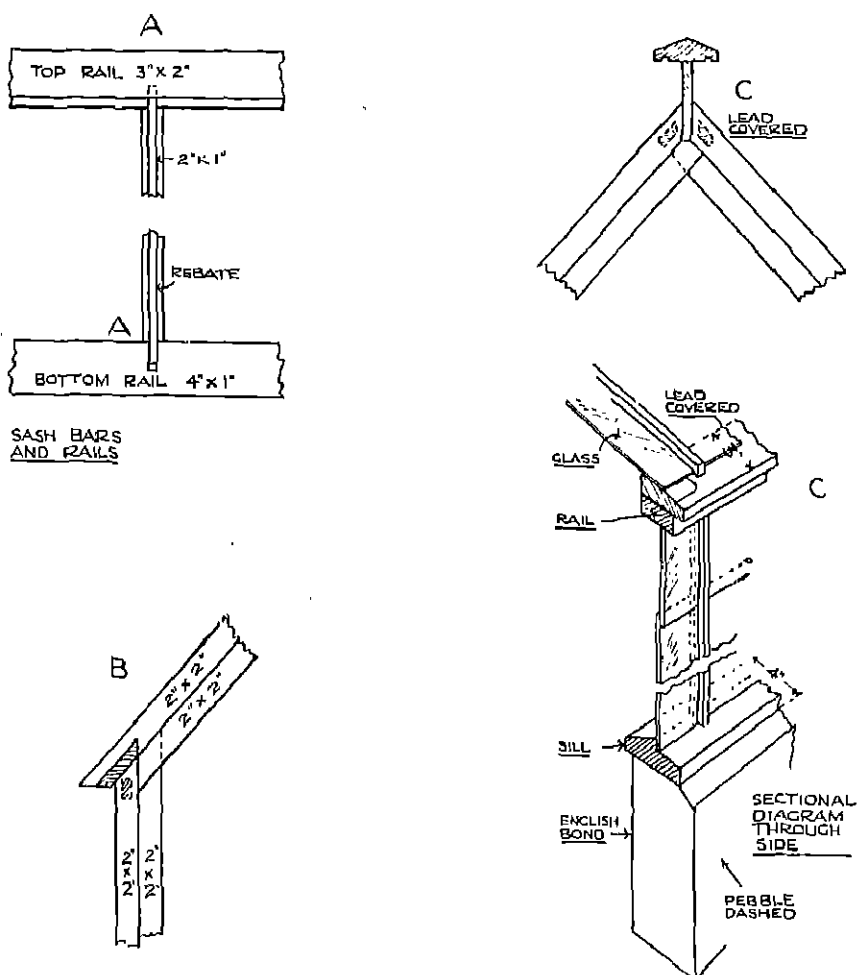
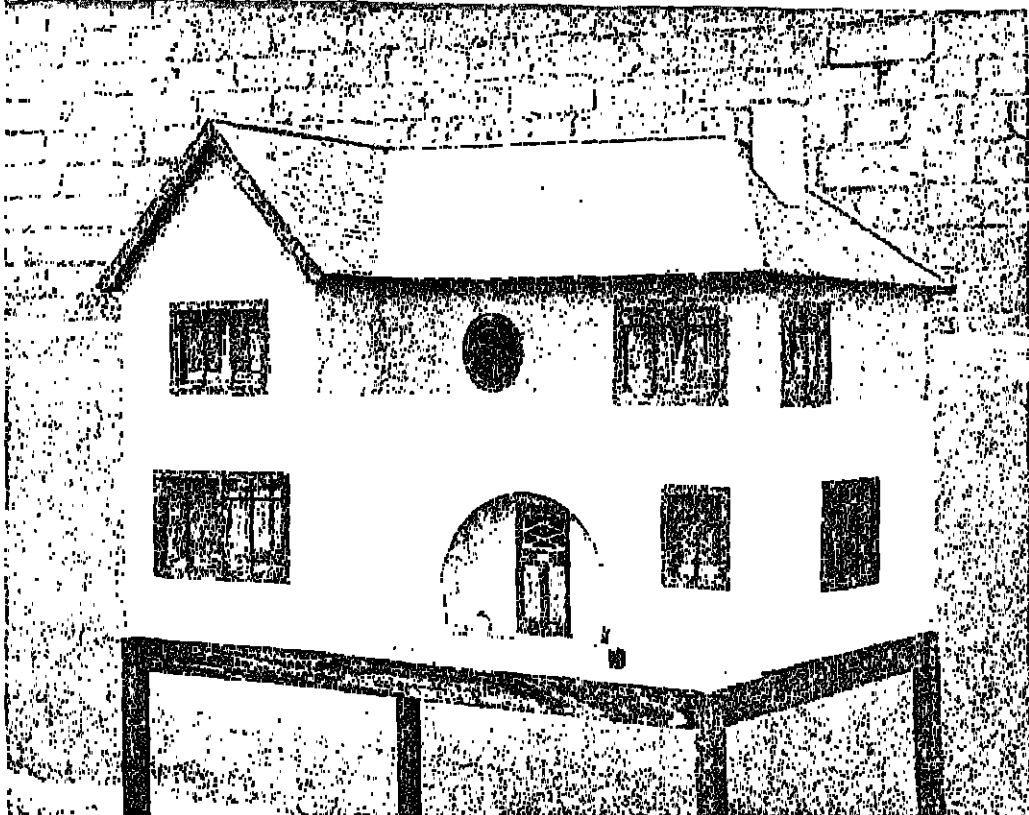


FIG. 130b. CONSTRUCTIONAL DETAILS OF A GREENHOUSE

ILLUSTRATIONS OF GENERAL PROJECTS



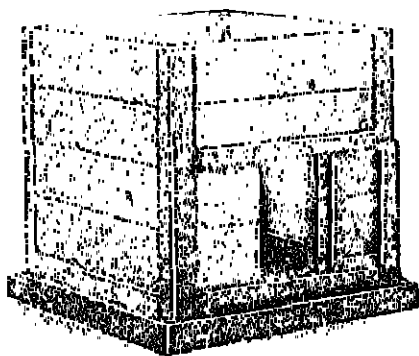
MODEL HOUSE FOR INFANT AND JUNIOR TEACHING

ALL the following illustrations are of work which has been carried out by senior pupils, with the exception of the scale models of building construction practice which were completed as part of a technical course following upon the day-school work.

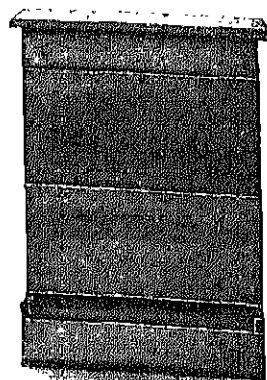
Detailed diagrams of these examples shown in the illustrations are not given as they follow the general lines already laid down for similar constructions.

The POULTRY UNIT shown in the frontispiece was built on the school premises and has already seen hard service.

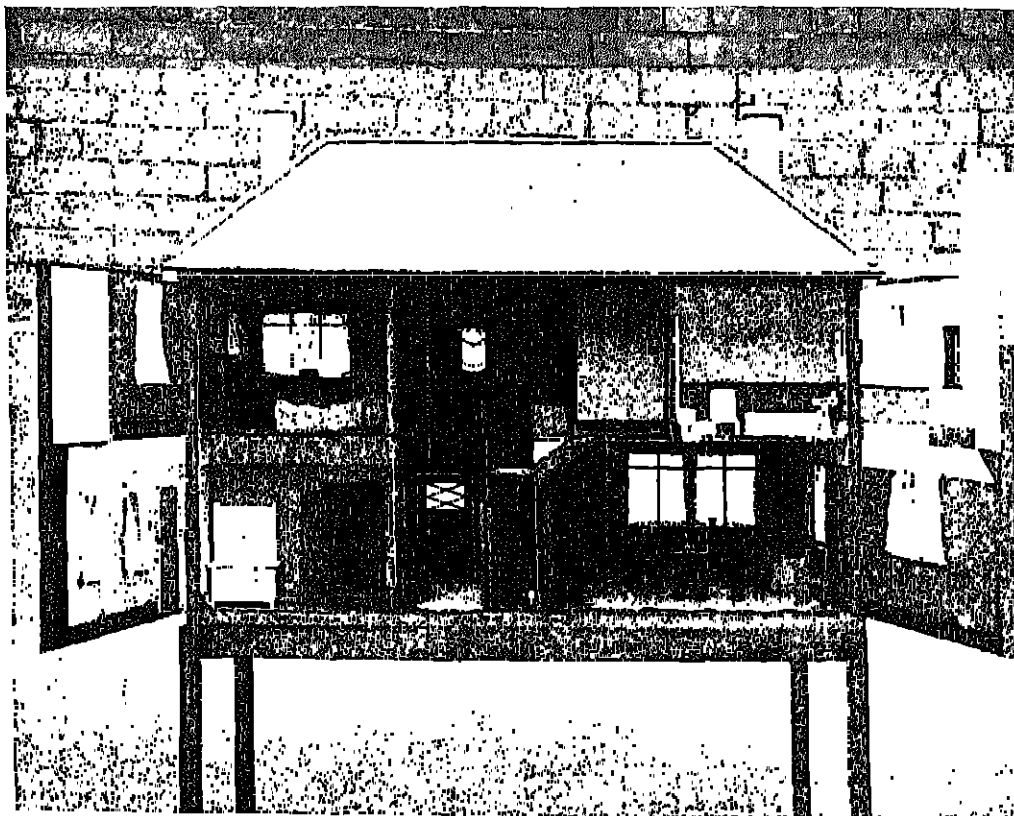
The STAGE, also shown in the frontispiece, has been built in the hall of a senior school and is on the point of completion, the woodwork being neither stained nor painted as yet. Full lighting effects are fitted, and the boys gained very valuable experience whilst carrying out such an ambitious project. When consideration is given to the advantages which are conferred upon a school by the possession of a stage, it is seen to be worth both the expenditure and the great amount of work that is involved.



BROODER



NATIONAL HIVE



BACK OF MODEL HOUSE SHOWING FURNITURE, WALL PAPERS, ETC. ELECTRIC LIGHTING IS FITTED THROUGHOUT

MODEL HOUSE.—Two views are illustrated here of a model house for the instruction of infants and juniors. The house occupies an area of 3 ft. by 2 ft. and is mounted on a trolley with small rubber-tyred wheels. It is a scale model in every detail, including such things as woven rugs, complete bed linen, electric lighting, carpeted staircase with stair rods, glazed windows and doors, full furnishing of all rooms and interior papering and decorating in suitable colours. The roof is detachable and the back wall is hinged in two parts to allow of access to the various rooms.

The whole project serves a useful purpose in the teaching of colour and arrangement to the juniors, whilst it provides a wide field of work for infant teaching. The project was carried out partly by day-school pupils and partly by a group working as a "hobbies" class. A large part of the model consists of three-ply wood, but all kinds of material were used for the various fittings and furnishings.

BROODER.—A view of a brooder with the top removed to show the rebated edges is given on page 494. The sliding door is very simple to make, as it consists of lengths of tongued

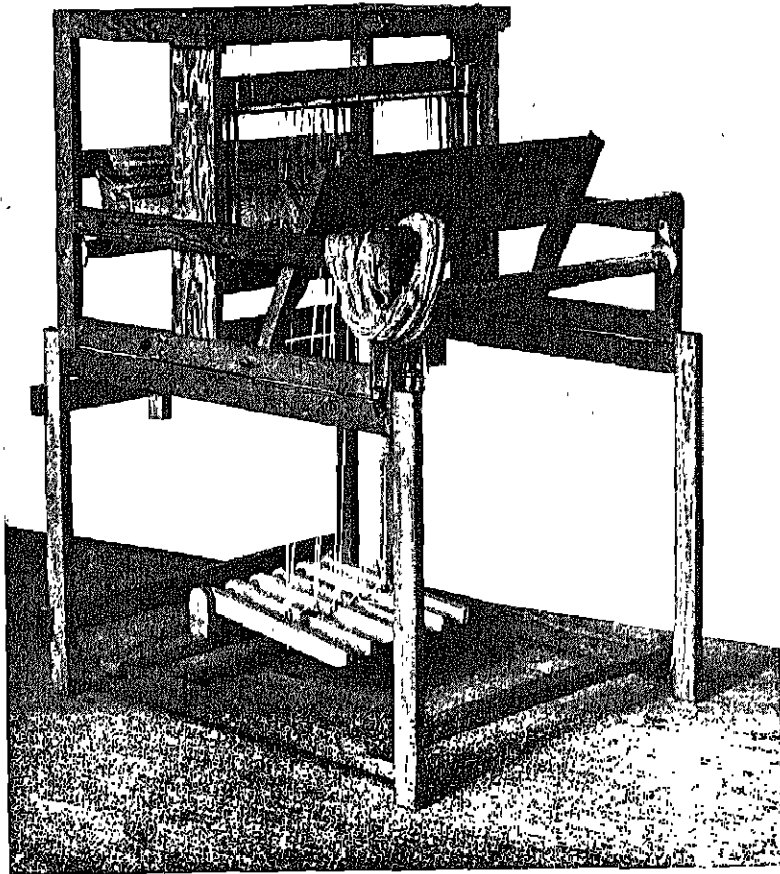
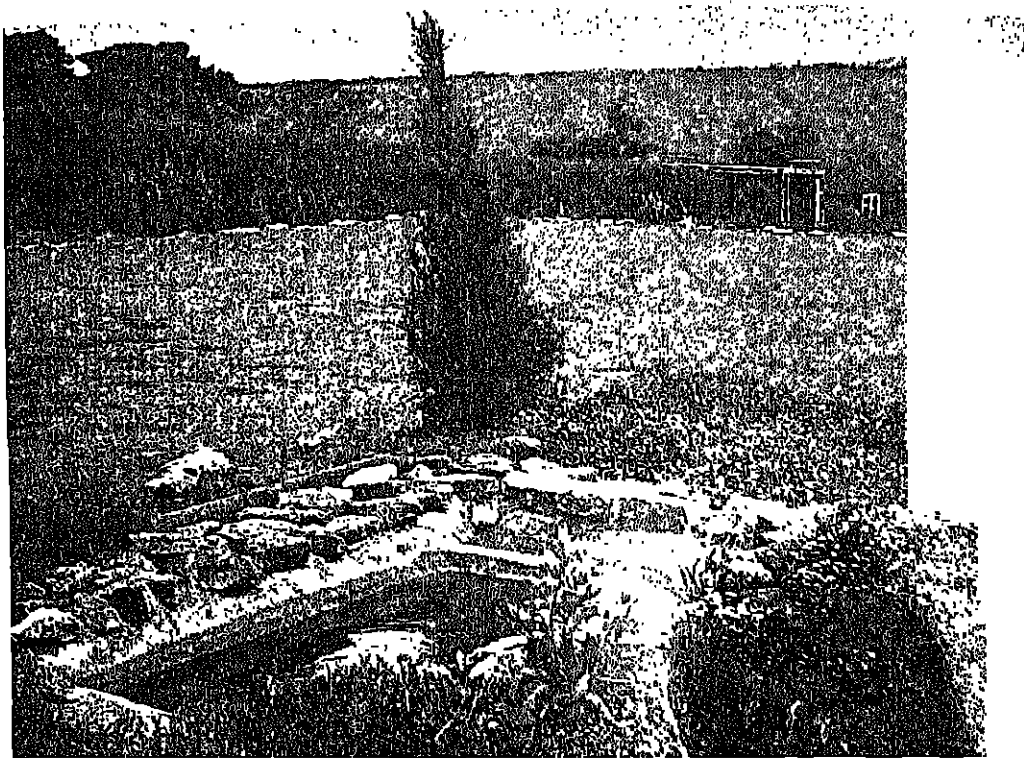


TABLE LOOM CONVERTED FOR USE AS A FOOT LOOM



CORNER OF A SCHOOL GARDEN SHOWING A PROPERLY CONSTRUCTED POND MADE BY THE CHILDREN

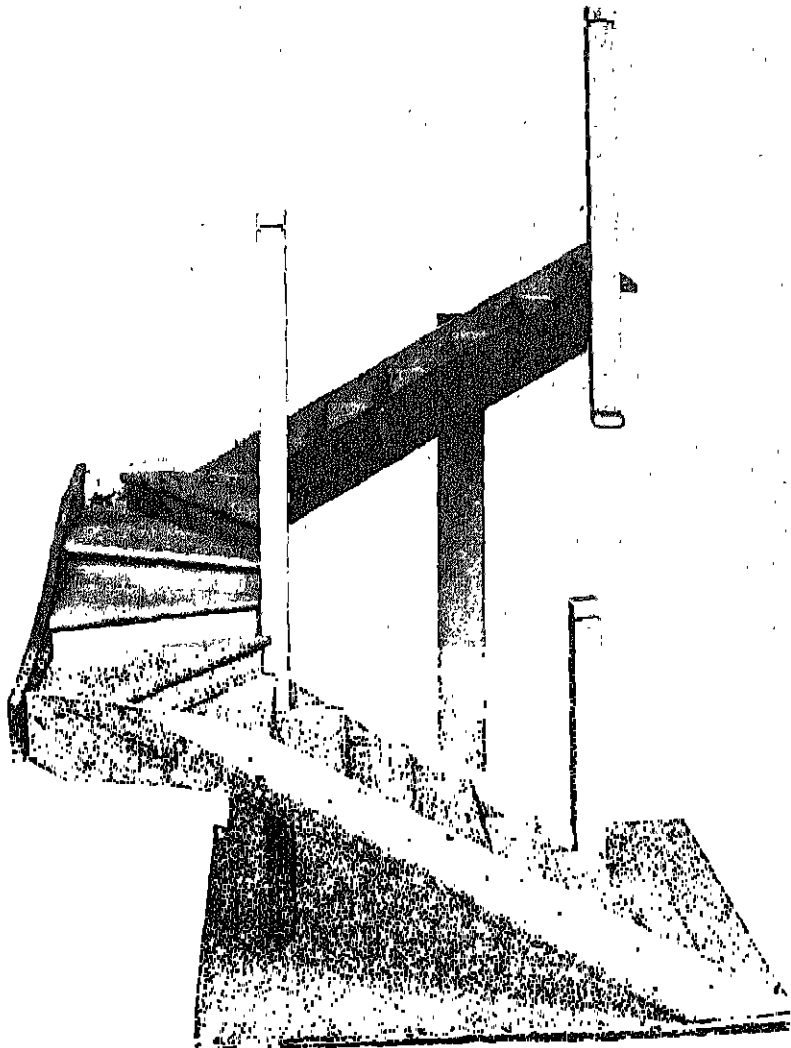


ORNAMENTAL GARDEN IN THE COURSE OF DEVELOPMENT. THE SEMICIRCULAR WALL ENCLOSES A RAISED POND AND A PAVED AREA MADE OF MOULDED BLOCKS

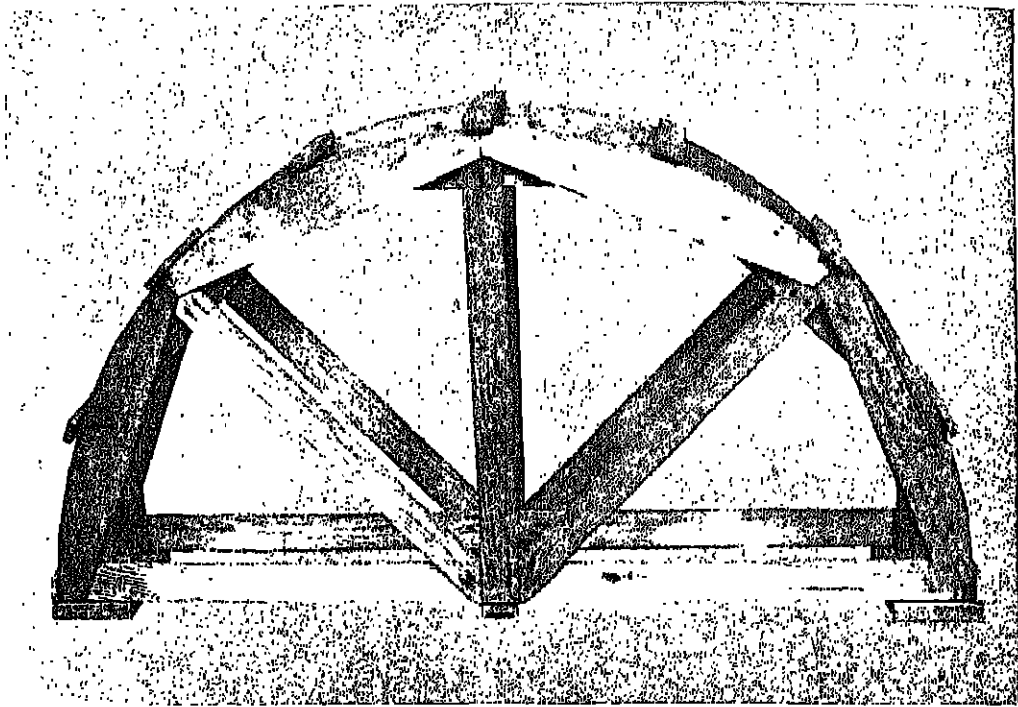
and grooved boarding, cleated across, which slide in between rebated guides. The bottom is made by dovetailing together four lengths for the sides and by housing a baseboard into them about 1 in. from their top edges. The brooder fits into this framing and rests on the sunk baseboard, so that the bottom is draught-proof and is easily detachable for cleaning.

NATIONAL HIVE.—The hive, page 494, is of the pattern given in the previous diagrams, and has one deep "super" and a shallow roof. The alighting board in this case is added separately.

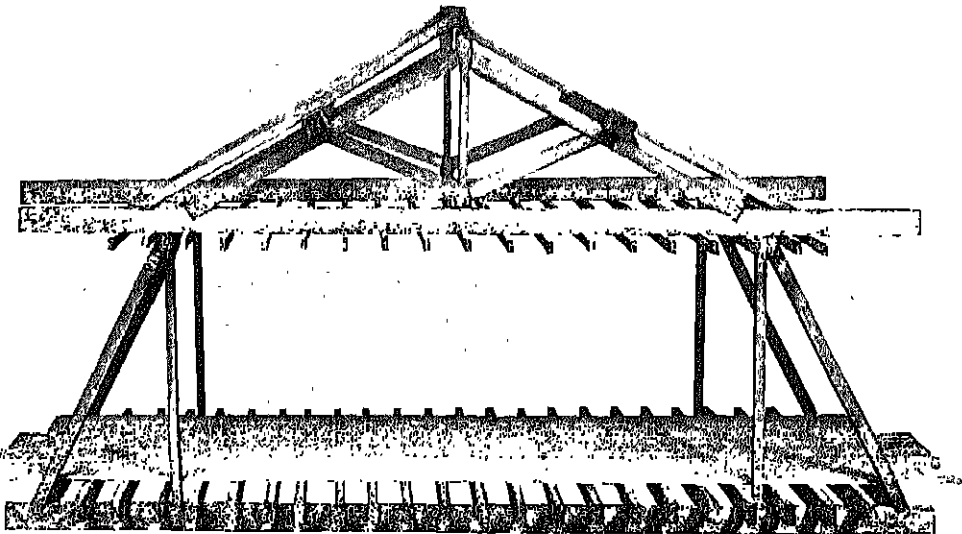
TABLE LOOM.—A really useful and fairly simple piece of apparatus is illustrated on page 495. The table loom was already in use in the school when it was decided to make



STAIRCASE CONSTRUCTION



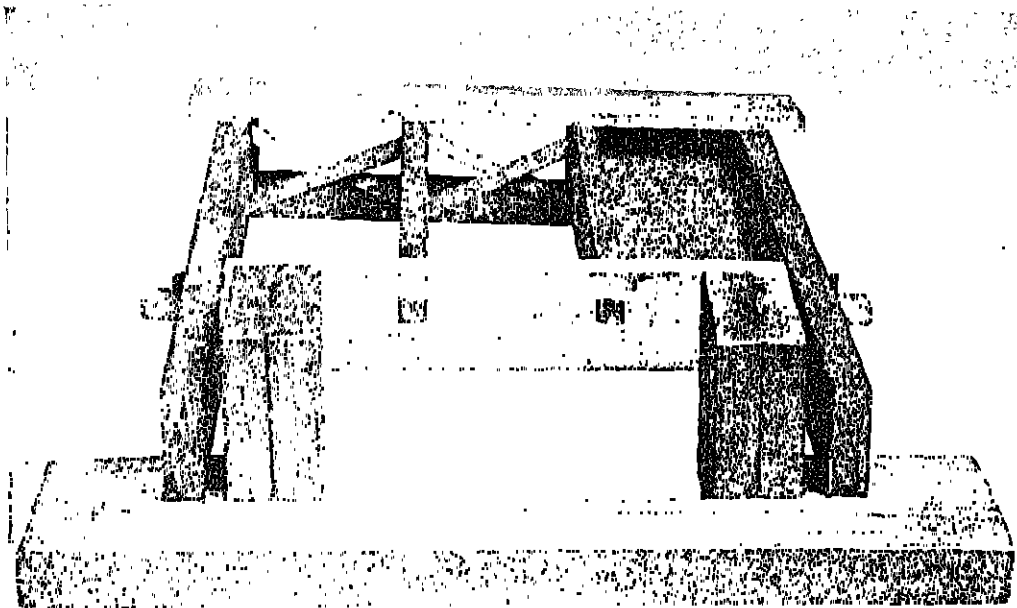
A WOODEN "CENTRE" FOR A BRICK MARK



FLOOR AND ROOF CONSTRUCTION

the stand shown in the photograph and so to convert the table loom into a foot loom. The effect of this improvement is to speed up the work considerably and to give more satisfactory training in the art of weaving than was possible in a limited time with the table loom.

WOODEN MOULDS.—The making of wooden moulds for cement and concrete blocks opens up another wide field of possibilities in regard to garden decoration. The two views shown on page 496 are of different school gardens in both of which this form of construction has been adapted to suit the particular conditions. The upper photograph shows a garden in which a pond has been constructed with a pleasing edging of rugged stones and blocks around which are disposed banks of flowers and flowering shrubs. The designing and building



METHOD OF FRAMING A HEARTH BY "TRIMMERS"

of the sunken pond, with its correct bed, foundation, lining, drainage and surrounds, make an excellent exercise, and the result is one of which any school might be proud.

In the lower photograph is shown a raised pond surrounded by a semicircular lay-out in natural stone, including a seat made by two large stone slabs and a pavement of moulded flags. This has been designed to take its place as part of a definite scheme to utilise the beautiful background provided by the creeper-covered wall, and the photograph cannot do justice to the effect as seen by an observer on the spot.

The illustrations given on pages 497, 498 and 499 show examples of building construction practice as carried out by students in an evening school in continuation of day classes in a school workshop, where the students are engaged in the building trades. On page 498 is shown a wooden centre for the building of an arched head to a doorway or window opening. In the lower photograph on the same page are given details of flooring and joists, ceiling and

roof-truss construction. Staircase construction is shown on page 497; and in the last photograph is shown the method of framing a hearth by trimming the floor joists, with details of the wedging and bracing.

Generally speaking, it is not advisable to apply model making to building construction, but a few demonstration pieces such as these, which were made for a purely technical course, are very useful for the supplementing of the simpler constructions needed for the type of course which has been outlined here.

TIMBERS

As the average senior school is allowed only a certain sum of money on a per head basis for expenditure upon craftwork, a limited range of timbers is likely to be available in the workshop. Those in common use are mentioned in the following list and a few explanatory notes are added concerning their chief characteristics and their suitability for particular purposes.

RED OR YELLOW DEAL.—Known in the southern counties of this country as yellow deal, and in the eastern counties, midlands and northern counties as redwood, red pine or red deal, this timber is really the Scots fir, or "*northern pine*."

In this country to-day it is by far the commonest timber in general use for all ordinary purposes of building construction.

The largest supplies are shipped from Sweden, from Riga and other Baltic ports, and from Archangel and Leningrad, of which the Russian timber is probably the most highly valued. Sweden supplies the greatest portion of manufactured stocks, including mouldings already worked to standard sections, flooring boards and match linings of all kinds; plasterers' laths, sawn to size and ready for fixing; skirtings, and framed and panelled doors ready for hanging.

The timber is imported in both graded and non-graded form. The White Sea timber is graded as "firsts," "seconds," and so on for five qualities, and comes in the form of deals, battens and boards. The Leningrad timber is graded in three qualities, but a large amount is imported that is unclassified. Swedish timber varies in classification, which may range from "firsts" to "sixths," with unclassified forms as well.

Red deal is easily worked; the first qualities being clean and free from knots are very suitable for the school workshop, the wood being strong and durable, and obtainable in any size. It is the best timber for the early exercises and for the general outdoor and apparatus work, but it does not take stain and polish well. The best finish for it is either paint, a wood preservative such as creosote or Solignum, or stain and varnish.

WESTERN RED CEDAR, OR CANADIAN JUNIPER.—This Canadian timber is especially suitable for outdoor work. It remains comparatively unaffected by changes of temperature, is strongly resistant to dampness or rot, does not warp readily, and possesses high insulating qualities, being used in Canada for roofing shingles. It is fairly light and easy to handle and takes paint well. These advantages make it one of the best woods obtainable for beehive construction and, in addition, it is available in wide boards.

AMERICAN WHITEWOOD.—Known in this country as Canary pine, or simply as whitewood, this timber is the product of the yellow poplar of the U.S.A. It is not a durable wood under outdoor conditions and its use should be restricted to indoor work. It has been popular for exercise work and for cheaper forms of furniture making, as it takes both stain and polish well and is obtainable in wide boards. It is clean and fairly hard, but brittle,

and needs extremely sharp tools for clean cutting across the grain. This is true of the large quantity of sapwood which is included in these stocks and which is greyish-white in colour, the wood of which seems to be denatured by the kiln drying to which it is subjected. The wood which is yellowish in colour has much better working qualities, and this is often confused with, and sold as, basswood.

As American whitewood is harder, heavier and dearer than deal, and is unsuitable for outdoor work, it has largely been replaced by the latter timber in school workshops.

YELLOW PINE.—Known also as Weymouth pine and Quebec pine, the first quality timber is clean and easy to work, and is the best softwood for all kinds of carving. It is especially valuable for pattern making, as it does not warp and twist, yet it is not a strong or durable wood for outdoor purposes and it should be restricted wholly to indoor uses. It has become comparatively expensive in recent years, probably owing to increased costs of transport before shipment, so that it is no longer used in such large quantities in the schools as was formerly the case.

SATIN WALNUT.—Because of its resemblance to walnut this timber, which is really the red gum of the U.S.A. and which is known to many importers as the California red gum, has been very popular in school workshops. The only advantages which it possesses are its comparative hardness, its straight grain and workability, and the manner in which it will take a high polish. Owing to the difficulty of seasoning it properly, its great disadvantage is a tendency to warp, twist and shrink. The extensive sapwood produced by this tree has been imported for some years under the name of hazel pine, and this timber is commonly used as a substitute for walnut, both in the school workshop and in the furniture trade.

Unless for any reason walnut is unobtainable it is not advisable to use this wood in the school, where it will have to be stored, probably for a considerable period. Even 2 in. by 1 in. stuff will twist completely round along an 11 ft. length after a short time in the hot, dry atmosphere of the average school timber store—which, for some inscrutable reason, is generally situated near the boiler house.

AMERICAN BLACK WALNUT.—The most generally used variety of walnut for solid work in the school workshop, it is sound and clean to work; oils out to a beautiful colour, or takes polish extremely well, and is not particularly liable to warp. It is imported as sawn lumber and is therefore to be obtained in all sizes of boards at a reasonable price.

Although as to beauty of figure it does not equal the English walnut, or some varieties of other European walnuts, it does possess an even quality of pleasant colour that is extremely rich when oiled or polished. On the grounds of ease and cleanness of working, of reasonable price, and of beauty of finish, it is the best walnut for use in the school. If possible, however, a certain quantity of English walnut should be kept in store for more advanced work.

MAHOGANY.—A number of varieties of this wood are obtainable from South and Central America, the West Indies and the West Coast of Africa, but only two are likely to be of use to the school. For work in the solid, at a reasonable price, the Honduras mahogany is still the best for school use. It is fairly light to handle, easy to work (providing that the tools are sharp and that the correct procedure is adopted), takes stain well and gives a fine polished surface. It is also the best ground upon which to lay veneers.

The other type in common use is the gaboon, a cheap West African variety which will be encountered as the outside surface of the average sheet of laminated board, mahogany-faced, which it is intended to veneer and to use for panels, flush doors or table tops. It comes

from the French Congo and the Cameroons, and is used for the manufacture of many of the cheaper grades of furniture. As a surfacing for cemented boards it is quite satisfactory.

Very little mahogany will be needed in school. It is expensive, and the present-day ideas of design are more suited either to veneered work or to solid work in walnut and oak.

OAK.—The greater part of the school stock of hardwoods will consist in all probability of two varieties of oak. For general constructional work requiring a mild variety of this timber, Japanese oak is the most suitable. Although it tends often to be dry, "cheesy" and brittle, due to its over-rapid seasoning, it has a lustrous surface when it is well cleaned up, is straight-grained, and has a pleasant colour. It is the easiest oak for a boy to work, although it does need extremely sharp tools.

Austrian oak was popular some years ago, but present shipments tend to be too coarse and open in the grain for small work in school. American white oak is used to a large extent in this country, but it is often hard and intractable in working and is, therefore, unsuitable for school purposes. Also, its colour is cold and greyish, and it tends to "shake" and to warp more than does the Japanese variety.

Care should be taken in storing the Japanese oak. It should be stacked between fillets to allow of free passage of air all round each board, whilst the weight of the stack helps to keep the boards flat, as the timber is artificially dried and tends to absorb moisture rapidly. If the boards are stood on end, loose, they will cast badly. Casting is the hollowing of the sapwood side of the board, due to shrinkage of the fibres when they are exposed in a hot, dry atmosphere. If, on the other hand, the board is exposed to a cold, damp atmosphere, the sapwood side of the board swells, and casting will occur with the hollowing of the heartwood side instead. If a board is badly cast and it is desired to work it almost at once, it is best to damp the hollow side by holding it under a tap so that the water can be directed along the centre part of the board, after which the board is laid upon the floor with the dampened side downwards. After a short time it will be found that the swelling of the fibres on the hollowed side has brought the board flat again. Unless it can be jointed and glued up at once, it is best to damp the same side lightly and to leave it on the floor until the work can be resumed, repeating the process until gluing up takes place.

For constructional work generally the plain, straight-grained oak will be used. Where it is required to make use of the figure or silver grain, for panelling, etc., the quartered or wainscot cut timber should be specified. This figure is obtained by cutting the boards radially from the log, a method which adds considerably to the waste, and therefore to the expense, of this type of cut board. The commonest method is to cut boards as several parallel thicknesses in a group, the groups being disposed radially round the section of the log. This means that there is less waste from the log as a whole. At the same time, only the centre board, or boards, of each group will be truly radial in position. Therefore, these few boards will have the finest figure as they will lie parallel with the medullary rays, whilst the adjacent boards will lie partly across the rays and will diminish in width. This method is customary with both the American and Japanese types.

veneers AND FANCY WOODS.—A limited range of these woods will probably be available in the school workshop, and it is suggested that, of the many varieties obtainable to-day, the following will be amongst those most suitable for school use. Some of them are difficult to lay, such as the burrs and curls, and the bird's eye varieties such as maple, so that these should be ordered in saw-cut thickness and should be laid with a caul. They are therefore classified as they should be ordered, as saw-cut or knife-cut, although they are obtainable in either thickness.

Saw-cut veneers.—The following are the principal veneers of this class. They should be laid with a caul:—

Amboyna.—A beautifully marked burr, from the Moluccas, which finishes as a rich brown flecked with dull orange. It is very brittle, and being a burr it tends to break in all directions. Tones in well with American black walnut for patterns.

Black bean.—An Australian wood resembling walnut. Has straight grain, with a strongly marked stripe. Useful for contrasting with lighter woods.

Blrd's-eye maple.—Golden to yellow-brown. Cockles badly, but is worth including because of the high polish it will take, and because of the beauty of its appearance when it is used in conjunction with the warmly coloured woods such as mahogany. To finish, use only a white shellac polish, without filling.

American black walnut.—An extremely strong veneer, which will pull the ground out of truth unless both sides are veneered with it, or unless a thick laminated board is used. Fine, dark wood for contrasting patterns or crossbanding. Often obtained with good figure.

Lacewood.—A very beautiful veneer of golden-brown colour, flecked with darker rays. Tones in well with either walnut or mahogany.

Macassar ebony.—Probably the most striking veneer for crossbanding that is at the same time easy to lay. Strong, though brittle, and finishes to a high polish if required. A dark, warmly coloured wood, which is strongly marked with lighter bands or stripes.

Sycamore.—A hard, tough veneer with a lustrous white surface. Easy to lay, but, if bought in knife-cut thickness, needs the greatest care in scraping and finishing as dark patches appear where the glue is showing through if the veneer becomes too thin. This often happens owing to uneven scraping or over-much glasspapering, and therefore this veneer is included in the saw-cut section. Takes a very high polish, and is a suitable veneer for obtaining a vivid contrast with walnut or Macassar ebony.

Knife-cut veneers.—The following veneers should be laid with the hammer:—

Italian and Circassian walnut.—Often sold as French walnut. Very beautifully figured with dark, wavy stripes. Easy to lay, and valuable for quartering of panels. For this work, a parcel should be ordered which consists of successive sheets cut from a burr or from a log, and having the same characteristic markings in each case. Thus, by reversing the alternate sheets, a quartering "match" is obtained round the joint lines. Takes a very high polish.

Sycamore.—Mentioned under saw-cut veneers. May be included in this section, provided that the necessary care is taken in finishing the surfaces.

Zebrano.—A highly decorative veneer with dark stripes. Very effective when used for large panels in conjunction with walnut or Macassar ebony as crossbanding.

Other veneers, quoted above as saw-cut, may be used in knife-cut thickness if desired.

Mahogany has not been included as, although it possesses great beauty of figure, but little work is carried out in this timber in the school, largely owing to its expense. Also, if good timber is used, it is unnecessary to use veneer in addition, but if the gaboon-faced laminated board is included in any particular mahogany job, then a small quantity of *curl* and *fiddle-back* veneer may be needed.

Finally, in connection with veneering and the use of laminated board, it is very necessary that care should be taken not to expose plywood and laminated board to dampness, or to currents of moist air. If this happens, the cementing is softened and the outer thicknesses of the board swell, causing large blisters which it is impossible to deal with adequately. Thin plywood will be warped to such an extent that it becomes useless. All such stock should be kept at an even temperature, and in dry air exposed neither to damp nor to the direct heat of hot-water pipes or radiators.

E. H. ARNOLD.

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